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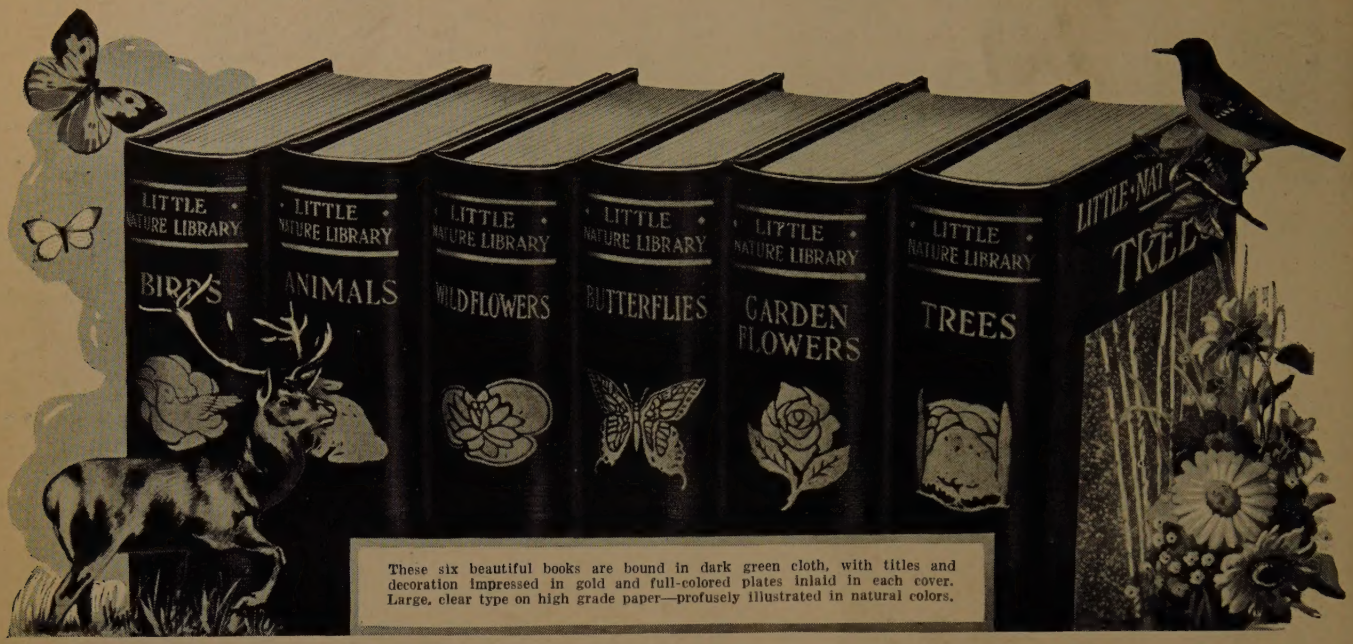

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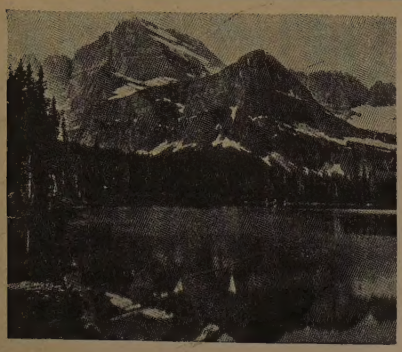

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Blue Ridge Trails

The Potomac Appalachian Trail Club announces the publication of the second edition of *Guide to Paths in the Blue Ridge*. The book is one that should be in the hands of everyone who hikes in Pennsylvania, Maryland, Virginia, West Virginia and the District of Columbia. It covers in detail 612 miles of Appalachian Trail from the Susquehanna River near Harrisburg to the Virginia-Tennessee line, as well as 273 miles of side trails. The present edition is, in fact, an entirely new book reflecting the tremendous advance in the development of trails in this region. It is available from the Potomac Appalachian Trail Club, American Security Building, Washington, D. C., for three dollars.

Hiking Program

A splendid program of Nature walks is sponsored by the Union County Park Commission whose headquarters are in the Administration Building, Warinanco Park, Elizabeth, New Jersey. Dr. C. P. Fordyce of Westfield, N. J., is chairman of the hiking club.

Million for Birds

One million dollars of Emergency Conservation Work funds have been allocated for migratory-bird restoration purposes by President Roosevelt in an order authorizing the purchase and rental of lands as refuges for migratory birds and other forms of wild life that constitute a diminishing natural resource. Acquisition and proper development of the refuge lands will provide protection not only for the depleted wild-life resources but for the lands themselves. The work incident to acquisition and improvement will also provide employment on useful public work.

Jay N. Darling, Chief of the Bureau of Biological Survey, in expressing his satisfaction over the action of President Roosevelt, said that this is the first real opportunity we have had to restore to our birds some of the areas we have taken from them. "Various promotion schemes," he said, "have robbed the birds of more than 17,000,000 acres of nesting areas and homes for the young. Now we shall have a real chance to put some of these lands and marshes back to their proper uses—for the birds."

Rock Gardeners

Some 250 rock garden enthusiasts were on hand for the organization meeting of the American Rock Garden Society in New York. Robert Lemmon, one of the committee on organization, pointed out the need of such a group and the development of information useful to rock gardeners in this country. He pointed out that much of the European information on the subject has proved of little value in North America. The officers of the group are Montague Free, president; Robert Lemmon, treasurer; Dorothy E. Hansell, secretary. Regional vice-presidents were chosen at the first annual meeting of the Society at the Brooklyn Botanic Garden, May 22. Further information about the Society may be obtained from Mrs. Dorothy E. Hansell, 522 Fifth Avenue, New York City.

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BIRD-NEST PHOTOGRAPHY

By Lawrence D. Hiett

To those camera enthusiasts who have an interest in the observation and study of Nature, the photographing of bird nests will prove a fascinating hobby. The amateur naturalist will obtain as much pleasure from making a collection of such photographs as he would in collecting the nests and eggs themselves. Such a collection is more easily preserved, is less bulky, and above all, the collecting need not destroy the homes of these valuable allies of man.

An expensive photographic outfit is not necessary. The best type of camera for nest photography is that which has a ground glass back for focusing, and sufficient bellows to enable one to work at about three feet from the subject to be photographed. Plates, cut films and packs are generally used in this type of camera.

The common roll-film camera with a focusing scale can be used if a portrait attachment lens is provided which enables one to work close enough to the nest to give a good-sized image on the negative. When this attachment is used it is necessary to measure accurately the distance from the nest to the lens and set the focus at the proper place on the scale, as indicated in the directions accompanying the attachment.

THE YELLOW-BILLED CUCKOO BUILDS A SIMPLE NEST OF STICKS AND GRASS WHERE IT LAYS THREE TO FIVE PALE GREENISH-BLUE EGGS

In photographing nests on the ground, in bushes, or in the lower branches of trees, a firm tripod is necessary. For nests on the ground, a small tripod that will close to about a foot in length is best. If the tripod when fully extended does not reach a nest in a bush or tree, sticks can be firmly tied to the legs, making it any desired length that will hold the camera steady. If a tall stepladder can be taken to the site of the nest, it will prove an excellent aid in reaching high nests. The tripod can be lashed to the top of the ladder and the operator can stand on the steps while focusing.

NEST AND EGGS OF THE ALDER FLYCATCHER. NOTE THE SPECKLES ON THE EGGS SHOWING CLEARLY IN THE PRINT

Nests located in tall trees present the greatest difficulty. For these it is necessary to fasten the camera to an adjacent limb, or in some cases it may be better to tie the tripod to a branch below the nest.

The tilting tripod top and a ball and socket joint are very handy accessories for nest photography. When the latter is used the camera may be tilted at any angle and held firmly in place.

The photographer should disturb the nest and its surroundings as little as possible. Some birds will desert their eggs quite readily if their nests are disturbed. Interfering branches should be tied back and carefully replaced in their natural position after the photograph is taken. Branches that shade the nest should never be cut off, as this would cause the birds much discomfort from the hot sun.

If possible avoid photographing nests in direct sunlight. Photographs taken under such conditions give too much contrast between the highlights and shadows, and the markings on the eggs show poorly. The best results are obtained if the picture is taken while the sun is under a cloud, or if there are no accommodating clouds in sight, the nest may be shaded with a piece of cheesecloth or the focusing cloth.

In composing the picture on the ground glass or in the finder, enough of the surroundings of the nest should be included to indicate its location. A view looking directly down upon the nest should be avoided. A much better idea of the form of the nest can be obtained if the camera is tilted diagonally downward so the side of the nest and a portion of its interior are shown. It is not necessary that all of the eggs show above the rim.

After carefully focusing on the nest, the aperture should be reduced sufficiently so the nest and the immediate surroundings are in sharp focus. This will necessitate the use of a small aperture and a consequent lengthening of exposure. If a camera is used that cannot be focused by means of the image on the ground glass, one of the smaller stops should always be used.

No fixed rules can be laid down for the length of exposure, but a few trials under varying conditions of light should enable even an inexperienced operator to judge the exposure time with reasonable accuracy.

Although the photographing of nests is one of the simpler branches of Nature photography, the difficulties to be encountered are sufficient to bring a satisfying reward for the use of all of one's care, forethought and ingenuity. The experience so gained will serve as an excellent introduction to the fascinating sport of photographing the birds themselves.

•

A group of three splendid and practical photographic articles have been acquired and will appear on this page during the coming three months. They will be a real aid to your photography.

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Between June 28 and July 3 most of the camps for boys and girls will open.

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A "Crazy" Oriole

"Do birds ever go crazy?" asks Mrs. John D. Bulson of Worcester, New York, describing an experience with a female oriole. It started with the bird pecking at the window pane, apparently fighting her reflection. She kept at this steadily, even to the extent of being entirely indifferent to the love song of a male bird singing to her from a nearby shrub. Fearing that the oriole would injure herself, Mrs. Bulson hung an old, dark-colored blanket over the window. Quickly the oriole discovered a two-inch hole in the blanket near the top and dove through it, continuing her attack upon the window pane. When the blanket was moved so that the hole could not be entered, the oriole dashed madly over to a nest where a chipping sparrow was brooding her eggs, drove the sparrow from the nest and ate the eggs. Then off the oriole went to a neighbor's window and went on fighting the reflection, keeping it up for two days and then disappearing. Was it insane jealousy of herself, or what was the inspiration of these strange antics?

Bear Protection

Organized last January, the Bear Protection Society now announces the officers of the Society and the members of its executive board. The honorary president is J. A. McGuire of Denver, Colorado, founder of *Outdoor Life*. Stewart Edward White is president; J. N. Darling, vice-president, and Harry McGuire is secretary-treasurer. The executive board consists of H. E. Anthony and Carl D. Shoemaker. The list of founding members is distinguished. The Society seeks to get public respect for the bear through telling the truth about him, and to fight for his protection.

Poetry Contest

The Chattanooga Writer's Club announces the annual Elberta Clark Walker Memorial prize for a Nature poem not exceeding 72 lines. There is a first prize of ten dollars for the best poem submitted, and two second prizes of five dollars each. The poems should be submitted anonymously, with name and address in a sealed envelope. Only one poem may be submitted by each contestant and no manuscripts will be returned. The closing date of the contest is November 1, 1934, and entries should be sent to Anna Mary Moon, 1000 Oak Street, Chattanooga, Tennessee.

Botanic Garden

Mr. Earl W. Wood, Long Beach, California, attorney, and Mrs. Wood have spent seven years assembling 350 varieties of native California flora and building up what is now officially known as the Castle Lodge Naturalistic Botanical Gardens of California Native Plants. It is located at the mountain home of the Woods' on the north fork of the San Gabriel River, fifty miles northeast of Long Beach. They have dedicated it to the purposes indicated by its name and it will be maintained under the auspices of the Agassiz Club of Long Beach.

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DUCK CONSERVATION AND BAITING

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SOME COMMENTS BY A CONSERVATIONIST-SPORTSMAN

• • •

SAM ANDERSON is a conservationist and a member of the Advisory Board, a committee appointed by the Secretary of Agriculture in connection with the administration of the Migratory Bird Treaty Act. He is, also, a life-long sportsman who has come to realize that our waterfowl cannot withstand a constantly increasing amount of persecution. Not only that, but Mr. Anderson loses few chances to express himself, always with emphasis, and with facts behind his utterances, whenever he feels that he can help the hard-stricken birds. With the majority of the best-informed of the true conservationists, he realizes that the baiting of waterfowl to lure them to the shooting stands has become a hazard of the first magnitude. A recent broadside on the subject was published by him in the *Pioneer-Press* of St. Paul, Minnesota. It seems to have been inspired by an announcement by the Biological Survey that a decision on this subject has been postponed until after the close of the open season.

Mr. Anderson stresses the fact that the gunners from the wintering grounds of the waterfowl predominate in any gathering held to consider means of reducing the disastrous kill that is steadily exterminating our stock of migratory game. Lack of space forbids a full discussion of all the points brought out in his article, but a few quotations show its trend, and their sentiments are such that we feel they belong on this editorial page. Speaking of the hearing held last August on the subject of waterfowl baiting, Mr. Anderson says:

"All Federal Government hearings on the duck situation are held in Washington, remote from the great breeding area and under the eaves of the larger portion of the wintering zones. As the result, the consuming element at the hearings is represented in full force and few appear to speak from the producing territory. More real downright meanness and coldblooded selfishness is evidenced at these hearings than would seem possible from decent men. . . . To sit in ambush and lure to grain piles within gun range hungry ducks and geese is just as sporting as shooting domestic birds in a barnyard. . . . The baiters blandly claim the birds would get no food were it not for the grain provided for them, and that they, the baiters, are rendering a real conservation service.

"A statement of what happened at the recent hearings at Washington tears the mask from the pretensions of solicitude for the hungry birds. The proposed federal regulation provided that no shooting of waterfowl be permitted within gun range of baited grounds. To us out here it passes understanding that men with any instincts of hunting ethics or consideration of wild life conservation would object to so reasonable a regulation.

"But protest there was a plenty, both loud and bitter, from all the duck shooting element of the wintering grounds, and, shameful as it may seem, their state game and fish commissioners joined them in defeating the proposed regulation.

"However, the worst phase of the whole situation and the most disheartening of all, was the appearance with the opposition of the leadership of the American Game Association, Izaak Walton League of America, and More Game Birds in America, the nation's only country-wide presumed wild life conservation organizations.

"It is doubtful that these leaders spoke the sentiments of the rank and file of their groups. Certainly they did not represent their affiliated units in the North Central States, for the wild life conservation organizations of these states are all committed in opposition to the shooting of birds on baited grounds.

"The time has come for a showdown. If conservation is only a pretense with any of these national organizations, it should be known. If the leadership is one of betrayal, the organizations should set themselves right by the selection of new leaders who are heart and soul committed to the cause of wild life conservation and not meek servitors of the keepers of the waterfowl shambles and slaughter pens of the winter shooting areas."

In view of the continued scarcity of nearly all kinds of waterfowl, it would seem to be the plain duty of all organizations who are truly interested in their conservation to support actively the abolition of baiting and other destructive practices.

WEASEL AND WHITE-FOOTED MOUSE

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"... SITTING UP ON THE BROWN LEAF MOULD IS A JUMPING MOUSE"

THE GENTLE ART OF KEEPING STILL

BY E. CHESLEY ALLEN

ILLUSTRATED BY R. BRUCE HORSFALL

IT IS a trite saying that, in the society of our fellow human beings, silence is often a golden virtue; but to him who would be really admitted into the society of the wild wood folk, silence is as a pearl of great price. One may spend a day tramping in the open, see fifty species of birds, twice as many of flowering plants, myriad forms of insect life, and even catch fleeting glimpses of half a dozen mammals, but learn no real secret of the open. On the other hand, under favorable circumstances, a few minutes of absolute silence may usher one into the very secret places of Nature, and such brief intervals stand out as marked passages in the life of the Nature lover.

The pages of my journal record incidents, simple and commonplace in themselves, but which nevertheless have given me the feeling of being admitted into the very holy of holies; of being, for these rare moments, an accepted part of the great cosmos of life.

I am sleeping under the open sky. The softly-moving, late June air is just sufficient to give a little whispering lap of water along the gravelly lake shore a few feet away, and a marvel of poplar leaves shimmering against a moonlit sky. Beneath me is a fir-tip bed, and the fragrance of its soft sprays mingles with the countless night odors of the woods. On my right and close to my ear I become aware of the soft thud of tiny feet. Something whisks across my face and I hear the thud on the other side. Presently a little flying figure passes over my face again. Slowly, very, very slowly, I turn my head and open my eyes; and there, a few inches from my face, sitting up on the brown leaf mould is a jumping mouse. In the faint light I can just identify him by his ridiculously long tail. He is one of the most beautiful and active of all the lesser furry folk. In his night ramblings he has discovered in my reclining form something new to his philosophy, and in sheer bravado has amused himself by jumping across my face. Just now he is making his toilet by licking his tiny paws and passing them rapidly about his face and head; for, like all the other members of his family he is scrupulously clean. This finished to his satisfaction, he resumes his amusement of jumping over my head. A dark shape drifts across the face of the moon, and in a moment, from a tall spruce on the hillside, comes the call of a barred owl. In a flash my little entertainer has vanished.

Again I am sleeping in the open, but a threat of rain has made a light canvas roof necessary (roof only, without ends or sides). What a great deal we miss by imprisoning ourselves within opaque rigid walls! The soft drip of summer rain from leaf to leaf, from tree to shrub, shrub to moss, and down into the brown earth; the thread-

"A VALIANT KNIGHT OF THE SHALLOW WATERS, THE MALE STICKLEBACK IS GUARDING HIS NEST"

ed diamonds of dew on the orb-like web of the spider; the soft flight of moth wings threading the mazes of the undergrowth, or the dash of the dragon-fly in swift pursuit. Lying with half-closed eyes I am only dimly aware of the rising sun breaking through the white lake mists. At the edge of the thicket something is stirring. There is a soft purring cluck, low peepings and the patter of tiny feet. In a moment a mother ruffed grouse creeps into the open followed by ten powder-puffs of brown and yellow down. One may blunder upon such a family with the usual result of an angry mother exploding into fear and anger and the downy young scurrying for hiding-places; but to have an intimate peep into their normal family affairs is a rare opportunity. The flicker of an eyelid may destroy it all.

With head and tail depressed the mother advances, picking at a bit of green here or a sleepy, half-benumbed insect there, and calling softly to her family in low clucking gurgles. My canvas roof, tanned and dull with many days of sun, is accepted as a part of the landscape, perhaps a large boulder; but what about that quiet form on the fir boughs? Suddenly the mother's head goes up, she utters a single sharp staccato note, and in a flash every downy form is crouched flat against the earth. The wary mother advances. I am to be tried by one of the most exacting judges in the whole out-of-doors. Will I win or lose? Very slowly I almost close my eyes. Why do their lids persist in flickering? I breathe with intense caution. Mrs. Grouse circles my bed, comes close to my face, returns to the edge of the tiny clearing, utters a little reassuring gurgle and again her little ones are about her. I have won. She walks across a corner of my blanket, and I experience the elation of feeling the patter of tiny feet as one of her family runs across my legs. But something stirs on the other side of the clearing; and a red squirrel, that, for several days, has been making bold with the contents of my knapsack, scurries into the open. Again that sharp alarm cry, and again the downy young become a part of the earth. Only a red squirrel it is true; but furry folk who help themselves from the contents of smaller birds' nests should not be trusted too far. As the red head and shoulders are about to disappear into a corner of the knapsack a whirlwind of fury breaks loose upon the intruder who, in complete rout, makes for the nearest tree from which he sends down unprintable remarks upon the whole grouse family. Mrs. Grouse, however, quite indifferent to his slander, after a short interval to compose her dignity and to be assured of complete victory, again assembles her offspring and the whole family disappears up an old logging road.

It is raining—a real downpour of warm summer rain. I am lying on the fir-tip bed watching the water drip off the edges of my canvas shelter and with a feeling of satisfaction that I and my belongings are far enough from the drip to escape a wetting. Presently out on the wet leaves and mosses I see a tiny creature crawling toward my shelter. It is lizard-like in form, a little more than three inches long, and is marching along with head held high as if to get its bearings. It is the little red-backed salamander, and is commonly found in damp woods under logs or flat stones. Locally known as a "lizard", it is quite a different creature from the lizard because it has no scales, its body being smooth and damp. Unlike its tailless relatives, the toads and frogs, the red-backed salamander lays its eggs, not in the water, but in damp moss or under stones or logs in damp places; and its tadpoles live entirely a terrestrial life. But throughout their whole salamander existence moisture is essential. Taken into a dry place the body moisture soon evaporates and death results. This explains why my particular little visitor has chosen a summer downpour for his journey. Like some of his remote relatives higher up in the vertebrate group he had become weary of his surroundings and started out to see the world. Reaching the dry area under my shelter he

stops, turns aside and wanders off into the dripping woods, a tiny Columbus, bent upon the discovery of new worlds.

It has rained steadily all the morning; and now, in spite of the sun breaking through the torn clouds, the underbrush is dripping wet. A short tramp to a rocky clearing leaves me soaked from the waist down. But here, where the hot summer sun is beating down upon a large flat rock I spread-eagle out to dry. The low bushes fringe my rock on all sides. Everything is still. My noisy progress through the tangle has hushed the wood-folk into silence. But in this lazy heat and with the comfort of drying clothes it is easy to be patient, and here is already something to observe. Stretched between two bushes, and well supported by its strong stays, is the web of an orb-weaving spider. Apparently a part of the web has been damaged by the heavy rain, because repairs are in progress. The owner of the web is going from spoke to spoke laying her threads of fine sticky silk down behind her and making each fast to the spokes as she goes. She has nearly finished repairing the damaged section, and none too soon. A large green grasshopper, warmed into unusual activity by the hot sun, makes a high jump and lands fairly upon the newly laid threads. Its frantic struggles threaten the whole filmy structure; but the tenacious strength of that new silk is merciless, and at each struggling effort the victim becomes more involved. In the meantime the mistress of the web approaches and seems about to inflict a bite when a renewed effort from the grasshopper sends her out of reach of those powerful legs. Again she approaches, and again is repulsed. Now she backs toward her victim and, with a deftness almost too rapid to follow, throws from her spinnerets a ribbon of viscid silk, attaches it to the grasshopper by a sudden motion of one of her hind feet, and at the same time sets him whirling, so that in a moment he is completely swathed in silk and perfectly helpless. Mistress Spider, quite satisfied with her work, and, apparently not at present hungry, retreats to her tent-like nest in a curled leaf above the web.

"BEFORE IT CAN REGAIN THE AIR TWO OF THE WATER-STRIDERS ARE UPON IT"

In the meantime life is again active in the bushy cover beyond the edge of my flat rock. From a clump of viburnum comes the unmistakably juvenile chittering of young warblers being fed. It stops, and I catch a glimpse of a pair of Maryland yellowthroats foraging the nearby cover in search of food for their hungry fledglings. With their beaks full they dive into the viburnum bush and immediately the excited chittering begins again.

But other ears than mine have been noting the family affairs of the yellowthroats. Over the opposite edge of my rock appears a small brown head with sharp nose, alert ears and piercing, bead-like eyes. It is followed by a lithe brown body, and a short tail tipped with black. A weasel is foraging for his breakfast. Noiselessly he lopes around the edge of the rock, not noticing my silent form, and is about to enter the cover nearest the viburnum bush when I purse my lips and give the squeaking "cheep" of a mouse. The weasel wheels like a flash and faces me. I cheep again and almost laugh outright at the eagerness in those fiery eyes. Surely a mouse is lurking about that peculiar hump on the flat rock, and a very silly mouse,

too, to be advertising his presence so boldly. He will investigate and his brown undulating body lopes across the rock directly toward me. Then suddenly he hesitates. There is something not just right about that peculiar hump of rock; or, perhaps, he has caught a strange whiff of animal odor, because he edges away toward the fringe of bushes. I "cheep" again, but it is of no use, he is about to slip into the green tangle when fate plays an unexpected prank. My mouse call has been caught by other sharp ears, and a dainty white-footed mouse hops from the undergrowth upon the rock. It is all over in a breath. A flash of brown, a squeak of terror, and mouse and weasel disappear together.

"IT IS THE LITTLE RED-BACKED SALAMANDER, AND IS COMMONLY FOUND IN DAMP WOODS UNDER LOGS OR FLAT STONES"

The sheltered cove of the lake is in a breathless calm. Wild roses along the bank are reflected in the perfect mirror below, doubling the depth of beauty, while, farther out, in the shallow water, tufts of arrow-head are displaying their chaste white flowers each with a heart of gold. A pair of damsel flies with metallic-green bodies and iridescent black wings are flitting about their pointed leaves with what appears to my dull understanding aimless abandon. Certainly, by a comparison of definite purpose in life, just now I would have a low rating, for I am lying in the stern of a boat and looking idly down into the clear water. But my idleness is not without interest, for down there is a little world teeming with its own life. I can see a dozen forms of animal life in as many minutes of quiet watching, but I know that my limited vision sees but a small part of what is going on, for a drop of ooze from that muddy bottom a foot below, if placed under even a low-powered microscope, would reveal a dozen other living forms.

The water-striders, those miniature Peters who tread so lightly that their feet only bend but do not break the surface film, had fled at my approach; but, gaining confidence in my perfect stillness they have skated back, and are now playing about directly under my face. A small white moth flutters from a branch overhead and falls upon the surface of the water. Before it can regain the air two of the water-striders are upon it and have thrust their sharp sucking beaks into its body.

Down on the bottom a brown waterlogged stick nearly two inches long and an eighth of an inch in diameter appears to be coming to life. It slowly extends six long legs and as slowly rises towards the surface. An inch below the surface, however, it stops, hangs poised, and extends from the rear end of its body a long hair-like tube, the end of which just pierces the surface film into the air above. The water-scorpion, a relative of the water-strider, lives amid the debris at the bottom of ponds. His stick-like appearance and the very slowness of his motions help him to escape his enemies by remaining unobserved. But he must have air, and that long breathing-tube enables him to get it without actually exposing himself at the surface.

Amid the branches of a water-weed about half-way down is a little globular mass of vegetable fibres about the size of a walnut. It might be taken for an accidental mass of rubbish except that a tiny fish swimming near seems to take a keen interest in it. The fish is less than two inches long, very active, and, as it darts about, frequently erects a row of sharp spines along its back. Every few seconds it swims to the strange little mass amid the water-weeds, noses it carefully and apparently fans it with its fins. A water-beetle swims near, and in a fury our little fish pursues it several feet away from the sacred spot. Now comes a school of killifishes, and immediately the tiny sentinel bursts into a fit of passion, erecting his spines and fins and darting at first one and then another until they retreat in disorder. I say "his" correctly, for this valiant knight of the shallow waters is the male stickleback guarding his nest of eggs, His dainty mate, after depositing her eggs, has wandered off, perhaps to attend some social function for very small lady fishes, and her faithful lord is left with all the family cares. A little world peopled with individualists demands constant watchfulness. I can only wish him the success which such faithfulness deserves.

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Looking at the schedule for the August issue of Nature Magazine we find that Walter J. Wilwerding, author and illustrator, presents us with a fascinating feature on monkeys. This is based on a long period of study in the land of monkeys in Africa. Far removed from the Dark Continent is Ira Gabrielson's article on some of the fascinating plants of the northern Rockies. Jumping to a New York sky-scraper, Merton S. Yewdale writes an interesting story of a pair of pigeons. Then to the Maine woods for a glance at the rare Calypso, from whence we travel to the Great Smoky Mountains and finally wind up on a California beach where we meet some fascinating seashore life. Such an editorial voyage, with various other stops en route, makes August a fascinating summer issue.

THE PAINTING OF "SUMMER" AS RENDERED BY THE ARTIST WATTEAU

THE FOUR ZODIACAL SIGNS PICTURED REPRESENT THE SUMMER MONTHS

SOMETHING NEW ABOUT SUMMER

BESIDES A LITTLE THAT IS OLD, BUT THAT MAY BE NEW TO A GOOD MANY

BY CHARLES FITZHUGH TALMAN

"SUMMER," wrote Coleridge to Charles Lamb, "has set in with its usual severity," and the saying has been handed down as a jest. Such, no doubt, it was intended to be, as applied by the poet to the typical summer of the British Isles; but elsewhere in the British Empire truly severe summers are not hard to find, and the citizen of the United States experiences them without leaving home.

Of course our American summers—except in the southwestern deserts—are not severe in their entirety; but they never fail to produce some spells of hot weather of which the best that can be said is that still worse can be found somewhere else on the globe. If you are a philosopher, you may be able to console yourself for the discomforts of home-grown torridity by thinking about the Red Sea. There is no record that any vessel plying American coastal or inland waters was ever obliged to put about and steam against the wind to save the crew from dying of heat apoplexy; a not uncommon occurrence, in the summer months, on that frequented seaway south of Suez.

There are times when travel in America would be misery without a plentiful supply of iced drinks; but we have not found it necessary to erect along our roads "stroke huts" for the resuscitation of wayfarers overcome by the heat, such as may be seen on certain highways in India. The hot winds of our western plains are distressing, but they do not vie in deadly effects with the terrible simooms of Asian and African deserts.

So our summers might be worse. Nevertheless it is a fact that so-called hot waves—which, because they are not necessarily wave-like in their mode of progression, the meticulous meteorologist may prefer to describe as "heated terms"—are an outstanding defect of our climate. They are abominably uncomfortable—and that is not the worst of it. They actually impair the nation's prosperity in a variety of ways and to a far greater extent than most people realize.

Such visitations frequently cause immense losses to farmers. In many cases droughty weather accompanying a hot spell is partly responsible for reducing the yield of crops, but the mere cooking effect of the sun and of an intensely heated atmosphere is the cause of much irre-

WHERE COOLNESS CAN BE FOUND IN DOG-DAYS
Next to the air-cooled building the aeroplane affords the quickest escape from hot weather

trievable damage. When affected by drought alone most plants will rapidly revive if favorable weather follows within a reasonable time, but once their vitality is destroyed by excessive heat no amount of properly distributed rainfall can repair the mischief. A protracted hot spell, through its injury to crops alone, generally costs the country several times as many millions of dollars as does a first-rate hurricane disaster on our coast; although the latter always gets much more space in the newspapers.

Hot weather is also costly because it slows down many kinds of work, both physical and mental; even when the heat is not so extreme that, as sometimes happens, work is suspended entirely in numerous factories and offices. The economic losses thus occasioned are only partially offset by the stimulating effect of such weather on travel, the business of summer resorts and the sale of hot-weather goods.

The consequences of excessive heat extend far beyond the range of statistics. We have no data, for example, as to how many students fail in examinations on account of inopportune hot spells, or how many juries cut short their deliberations, regardless of the demands of justice, because of the unbearable heat of jury rooms. Neither have we much definite knowledge concerning the extent to which hot weather increases crime and miscellaneous wickedness, although the fact that it has this effect is notorious. The demoralizing influence of the sirocco, which brings oppressive warmth to the Mediterranean region, is well illustrated in that strange and subtle novel by Norman Douglas, *South Wind*.

An important fact about hot weather, which, though by no means a recent discovery, seems to remain persistently unfamiliar, is that it cannot be described at all accurately in terms of a thermometer scale. When the thermometer reads 90 in New York City, the weather is "hot," but the same reading does not imply hot weather in Yuma, Arizona. The state of affairs that we describe as "hot weather" is really a complex of several physical factors, and no entirely satisfactory scale for measuring it has yet been devised.

The weatherman measures the temperature of the air with a shaded and screened thermometer, because it cannot be measured accurately in any other way. His records tell us how hot the air gets during a hot spell, but give us no definite idea of how hot human beings, animals, plants, pavements and various other objects become in such weather; much less do they indicate the temperature sensations and physiological reactions of humanity to the weather, which constitute the most interesting feature of a hot wave.

Some of the most striking physical effects of hot spells are due to the intensity of the sun's rays falling on objects that, because they are surrounded by hot air, do not readily get rid of the heat they acquire by absorbing solar radiation. It is chiefly intense sunshine rather than hot air that causes apples to bake on the sunward side of trees, asphalt to soften and steel structures to warp out of shape. Under the tropical sun of the Isthmus of Panama, steel, painted black, has been found to have a temperature as high as 133 Fahrenheit, when the highest air temperature of the day was in the nineties.

Human sensations of temperature are still another story, since they are determined by the combustion of food in our bodies, muscular activity, clothing and several external factors, including air temperature, radiation from

GAUGING THE HOT WEATHER
The katathermometer measures the cooling power of the air. The thermometer bulb is heated by dipping in hot water and the observer notes the rate at which it cools off
PHOTOGRAPH U. S. BUREAU OF MINES

the sun and terrestrial objects, humidity and wind. Widely different combinations of all these things produce the same feeling of warmth or coolness. Hot dry air makes us feel no warmer than humid air at a much lower temperature. A strong wind offsets the effect of high air temperature.

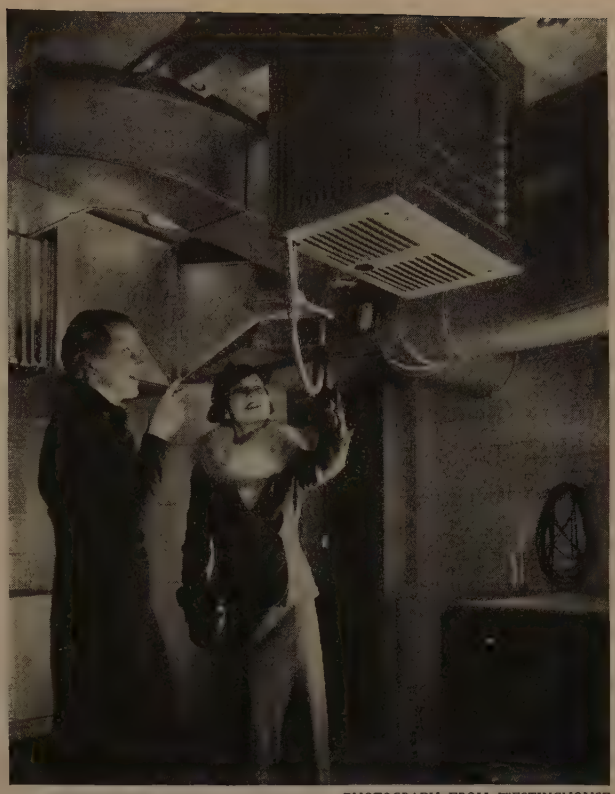
Summer comfort does not depend upon the coolness of the air but upon its "coolingness," or, in other words, its capacity for carrying away excess heat from our bodies, with the aid of evaporation and other processes. Several instruments, such as the katathermometer, the frigorimeter and others, have been especially designed for measuring the cooling power of the air in relation to human comfort, and eventually it will probably become customary to record the intensity of hot spells by means of such an instrument, as a substitute for the misleading thermometer.

An electric fan does not cool the air of a building, but it does cool the occupants. Thousands of automobiles dashing through the streets do not cool the air of a town, but they are a welcome refuge from the heat for those who travel in them. The introduction of automobiles is believed to have decreased the number of heat prostrations during hot waves, not merely by saving many people the muscular effort of walking but by providing them with plenty of breeze in calm weather.

The automobile is a new means of keeping cool; the aeroplane, which takes you in a few minutes above the warm lower layers of the atmosphere, is another; but the greatest of all boons to sweltering humanity is the air-cooled building. Thanks to this newest device for conquering hot weather, our American summers are not what they used to be, and they will, with a great increase in the number of such buildings, be quite different a decade hence from what they are today.

HOT WEATHER ON PENNSYLVANIA AVENUE

During torrid spells at the Nation's capital people formerly flocked to the Weather Bureau kiosk to consult the thermometers. This long familiar landmark has now vanished from the scene



PHOTOGRAPH FROM WESTINGHOUSE

THE CONQUEST OF HOT WEATHER

The equipment for cooling the air in your home will soon cease to be a novel luxury and become a commonplace necessity

Meteorologists are in the habit of saying that climates, though not absolutely stable, do not change conspicuously in the course of a human lifetime, or even in the course of many centuries. The statement is doubtless true of outdoor climates, which are the only kind meteorologists measure. It is not true of indoor climates; and this is a fact of immense importance, because a majority of civilized human beings spend a much larger part of their lives in buildings than they spend in the open air.

Some real changes of indoor climate occurred ages ago. The cold of winter was mitigated in prehistoric homes by the introduction of fires. The heat of summer was assuaged, both indoors and in the open, when some savage first conceived the idea of waving a fan. The advent of the electric fan, more than a generation ago, brought about a striking change of summer climates in buildings all over the world.

Far greater changes are now in progress. The art of air-conditioning, which originated in the early years of the present century, was for a long time applied only to the task of keeping the air of factories and workshops at the right temperature and humidity for certain industrial operations. Its first applications were in the textile industries. The idea of making indoor atmospheres comfortable and wholesome for human beings came later. Only within the past ten years has much attention been

PHOTOGRAPH FROM THE U. S. DEPARTMENT OF COMMERCE

THE HEAT IS WORSE IN INDIA!

At the right of this picture, which was taken near the Khyber Pass, is seen one of the "stroke huts" erected along the roads for the care of sun-stricken travelers

given to the problem of indoor cooling for comfort.

Today many thousands of buildings, in America and elsewhere, are kept delightfully cool in the hottest weather. Cooling plants are operating in public buildings, office buildings, factories, theatres, stores, restaurants, hospitals, hotels and apartment houses. In a few years they will be common in private homes. They have been installed in railway trains and steamships. Some deep mines, where work was once almost impossible on account of the heat, are now artificially cooled. An air-cooled hotel now defies the terrible summer climate adjacent to Death Valley.

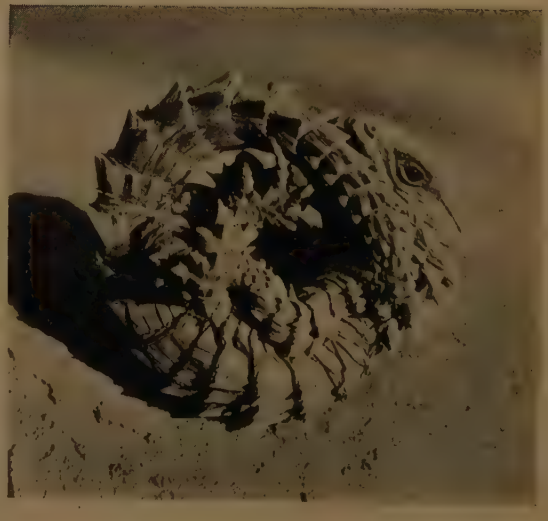
All this means that, though no evidence of the fact is found in weather records, *climates are changing;* rapidly, radically and permanently. Not yet everywhere, or for everybody, but already on so vast a scale that these man-made changes are more important in their effects, present and prospective, than any since the last Ice Age.

The new methods of controlling indoor climate are likely to revolutionize the habits of mankind. White people will be able to live in the tropics without losing their health and energy. It will no longer be necessary for the government of India to migrate bodily to the "hills" with the advent of the hot season, and Baguio will lose its utility as the summer capital of the Philippines. Our American capital, where already the Capitol and many other public buildings are air-cooled, will not fade from the political map in the dog-days.

Unfortunately the farmer's crops cannot be protected from overheating by this new art. Crops will remain at the mercy of the weather until the time comes—perhaps fifty years hence?—when substitutes for the things now produced by the slow, wasteful and precarious methods of agriculture are manufactured within the walls of buildings. Then summer will be completely conquered.

A "HOOPING" LIZARD

BY DR. WALTER ROSE



THE oft-repeated myth of the serpent's ability to hoop along with its tail in its mouth is possibly suggested by old Egyptian inscriptions portraying such a feat being performed and indicative of eternity or time. On the other hand the idea may have sprung newborn from the mind of some ingenious person who considered that such an accomplishment would be a good idea on the snake's part. Were the subject of our photograph a more common, or a more widely distributed creature, one might suggest that it started the story.

Zonurus cataphractus, or the armadillo lizard as we take leave to call it, has a somewhat restricted range in Namaqualand and Western Cape Province. Its habitat is amongst rocks in the most arid districts and termites form a large part of its diet. On the slightest alarm it seeks shelter in the deepest crevices where it crouches with armored tail thrown forward across the body and generally grasped by the mouth. When brought to the light of day, which frequently involves the help of a muscular native with a crowbar, it at onces assumes the attitude shown in the photograph which it retains the more determinedly when handled.

In the open it is, for a lizard, slow moving. The tail resembles that of most lizards in being frangible, but a very hard pull with the body firmly held is needed. The total length is about seven inches and the color that of brown sand. It is hardy in captivity and soon becomes tame, feeding readily on raw meat and insects, and is viviparous. Curiously enough this lizard's nearest relatives, show no indications of the "hooping" habit.

THE CORE OF A FOSSIL ALGAL REEF

This find in Glacier National Park, Montana, shows how the beds beneath were squeezed by the mass of plant-made rock above. One of the two oldest reefs, its age exceeds 900,000,000 years

ALGAE OF ANTIQUITY

BY CARROLL LANE FENTON

A group of people were climbing over the ice of Grinnell Glacier, which hangs upon the Continental Divide in Glacier National Park, Montana. Two carried picks, which proclaimed them geologists, and they often paused to examine rocks which had fallen from the surrounding mountains.

One pause was filled with exclamations, and the party gathered to look at something which one of the rock-hunters had found. It was a small stone, green and pinkish, formed by crumpled layers of lime.

To the geologists this was far more than a piece of rock. It was the fossil remains of a colony of algae—simple, green or brownish plants that lived there when the present Rocky Mountains were the site of a shallow sea. Surrounding its delicate fibers with lime, the colony remained while the muds of the sea floor hardened into stone, were thrust upward into mountains, and were gouged and planed by enormous glaciers. At last it fell from an ice-carved cliff, to lie on the surface of a remnant glacier, where summer visitors might find it. Between its burial and its fall, six hundred million years passed.

On slopes and ridges of nearby mountains lie many other fossil algae, also relics of life in an early sea. On one pass they form a hard, black ledge in which each colony crowds its neighbors so closely that hardly a bit of mud intervenes. Just below the Continental Divide other beds of these primitive plants form ledges more than a hundred feet thick, into which a trail has been cut. Thousands of tourists ride that trail each year, yet few realize that their horses are walking across an ancient sea floor, on rocks that once were growing plants.

Few fossils in these massive limestones are more than a foot or two in thickness; many are only a few inches. But northward, near the Canadian border, lie real giants of the early seas. In a bowl-shaped valley, where a glacier once began, are colonies of algae that weigh many tons. Those that cause him the greatest concern are a pair of perfectly weathered specimens five feet thick and ten feet in diameter. They should be formally described under resounding Latin names, but who can name fossils that must lie near a high pass in the Montana Rockies?

More easily reached are two fossil reefs beside a new trans-mountain highway. Almost as perfect as diagrams, they show things we hardly can hope to find in modern algal reefs or atolls. First we notice the reef masses them-

A LEDGE BUILT BY SIMPLE SEA PLANTS

Once in the sea that crossed western Montana, they now lie on a windswept mountain

selves; flattened ridges built by plants upon the soft lime mud of the sea. We can be sure those muds were soft, for the weight of the reefs squeezed them down as the plants grew larger and heavier. For years people have argued this point, some saying that reefs are able to grow only on rocks already hard; but at last, through hundreds of millions of years, evidence comes which proves them wrong.

Nor is this all these fossil reefs prove. Although they seem to be formed by one species of plant, it is one whose shape varied greatly. In the reef core it formed compact cones; where less crowded, it built spongy, crumpled masses; at points on which currents might beat, it grew in thin, wrinkled plates. But on open muds away from the reefs, it assumed a flattish biscuit-shape that we never would link with the plates or cones did these reefs not show all stages between. Here, among some of the oldest of plants, we trace variations in response to conditions under which they lived.

No algae had a harder time than the species found on Grinnell Glacier. Living in shallow, windy bays, its home was mud so recently dry that it still was checked by countless cracks. Storms often rolled young colonies about; lavas poured out beneath the sea and baked them into brittle red stone that is far harder than any marble. At last, of course, those eruptions ceased: but by that time the algae were too few to reclaim the still windy bays where their vast colonies once had numbered millions.

Were these the oldest plants in the world? No, for the reef builders are older than they, while ten thousand feet below the reefs lie thick beds of algal remains as closely packed as those near the Continental Divide. Here, too, one may walk upon fossil plants, and may photograph wind-beaten limber pines whose roots twine among algal remains.

Others, of equally great age, lie far down in the Grand Canyon. Below the rim of the "Inner Gorge," they are not easy for hikers to reach even though mules get to them with ease. Yet those who tramp down the Kaibab trail find the plants a good reason to rest—and a chance to recall botanical friends made on the mountains of the North. And what if those friends are lowly and staid, content to rest in rocky beds far from hotel or camp? Their ways still should command respect, for it is not every plant that has a history of prehistoric life on the floor of a Proterozoic sea, and has kept its head right side up through six hundred million years!

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A BATRACHIAN PUFF-BALL

BY DR. WALTER ROSE

It is a commonplace that certain people bear a striking resemblance to certain animals, and even in the batrachian world these quasi-human caricatures are encountered. The globular little creature here is *Breviceps gilbosus* and irresistibly reminds us of an old buffer grown corpulent from good living but most of its size is due to "wind" as its Dutch name Blaasop (blows up) indicates. It belongs to an exclusively South African genus and is especially interesting in that it makes its nest underground where twenty or so large eggs are laid. The embryos pass through a gilled and tailed stage in the capsule and emerge as fully formed frogs. *Breviceps* absolutely hates the water and never voluntarily enters it. The little warts on the surface have a similar function to those on a toad. A very large specimen fully inflated would be about the size of a golf ball, so, you see, it is not a large batrachian.

THIS is National Park Year, and it is hoped that every citizen who can do so will visit one or more of these great recreational areas. This and the succeeding three pages of Nature Magazine are, therefore, dedicated to the National Parks. Above is pictured the restful beauty of the Temple of Sinewava in Zion Park, while below is a glimpse of the fantastic beauty of Bryce Canyon. On the next page is shown one of the ancient ruins of fascinating Mesa Verde and a view of Mount Rainier from the Naches Pass Highway. On the facing page we see the majesty of the mountains of Glacier Park towering above St. Mary's Lake and a glorious view of the lower falls of the Yellowstone Canyon. Finally we have the mirrored beauty of Crater Lake and a view of the Grand Canyon from Mojave Point.

Pictures do scant justice to these Parks, our common property. One must visit them and come to know them thoroughly to really appreciate them. And this is a good year to do so and to gain from the experience a greater appreciation of the resources of our country.

FOSTER PARENTS CARING FOR THE FOOD NEEDS OF A WILD ORPHAN

Dogs had attacked this fawn and it was rescued and adopted by a CCC camp. Here breakfast is being served. The can contains castor oil but don't tell the fawn

THE CCC AND WATERFOWL

BY ROBERT FECHNER

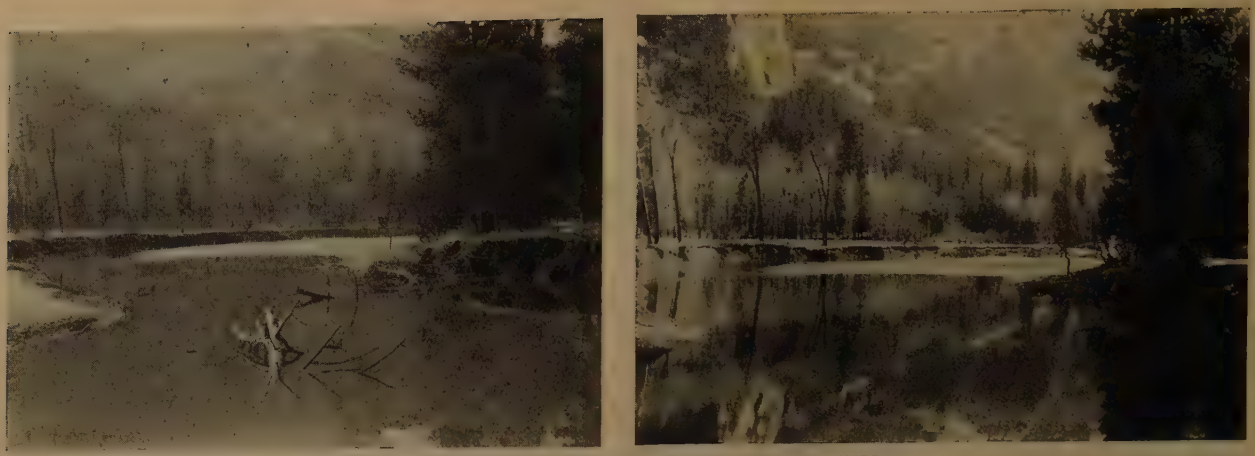
DIRECTOR OF EMERGENCY CONSERVATION WORK

THE new deal is being extended to waterfowl and other species of wild life. A share in this "extension work" has fallen to the Civilian Conservation Corps under the supervision of the Bureau of Biological Survey, U. S. Department of Agriculture. CCC camps are doing their small part in the big task of lifting our wild fowl out of a long-continued depression that has threatened disaster to the birds.

In brief, the CCC's part consists in making improvements in sanctuaries that are maintained by the Federal Government for the conservation of the nation's resources in ducks, geese and other valuable species. These improvements will make the refuges more attractive to the birds, facilitate administration and maintenance of the areas, and reduce the cost of future development.

These CCC camps are thus carrying on a valuable conservation program, but their usefulness in furthering conservation can not be measured alone by the improvements to the sanctuaries. As is well known, the camps are composed to a large extent of young men from eighteen to twenty-five years of age. When they enrolled, the great majority of these workers who came to the camps on the Biological Survey refuges knew little or nothing of the fundamentals of or the reason for the conservation and perpetuation of wild life. An opportunity was thus presented to the men in charge to imbue the minds of these young Americans with conservation principles of importance to proper wild-life protection.

Realizing this opportunity, camp superintendents and other members of the Biological Survey staff, through lectures, personal talks with individual workers, motion pictures on wild-life and forest conservation, and by other means, have captured and are holding the interest of the men—many of whom, having lived in cities all their lives, have been entirely unfamiliar with country environment. These young men, say the officials, have dis-



TWO SCENES SHOWING THE BEFORE AND AFTER CONDITIONS IN THE MERCED RIVER

The channel has been cleared. Such work carried on in many parts of the country by the Civilian Conservation Corps is aiding conservation of natural resources in fish and other wild life

played a remarkable interest in wild life and in efforts being made by the Government to conserve and perpetuate it. They have also evidenced a keen desire to learn more about Nature subjects. As those who have enrolled grow older and take various occupations coupled with other forms of useful citizenship they are not likely to forget the lessons they learned in wild-life conservation at the CCC camps.

One of the sanctuary areas being improved by CCC workers is just off Pamlico Sound in North Carolina. Here is the Swanquarter Migratory Bird Refuge—more than 15,000 acres of land and marsh about Swanquarter Bay, Rose Bay and Juniper Bay. Swans, geese and ducks find a resting and feeding place on this refuge; coveys of quail and many small animals live here; and the wild-life visitors include deer and bear.

Two problems have confronted Biological Survey officials on this refuge—how to make the area most suitable for the birds and how to administer it most economically and efficiently. CCC workers are helping in the solution of both.

Fire, for example, has been a constant threat to the refuge and all its wild-life inhabitants. Thick stands of trees with dense growths of underbrush have provided ready fuel and at the same time have made it difficult for firefighters to reach the flames. Now the CCC workers are cutting thirteen miles of firebreak, crisscrossed to divide the area into sections to which an outbreak can be confined. They are also building three steel towers as lookouts for use in spotting fires, as well as for observation of waterfowl and to facilitate patrol. One of these towers has already been built at headquarters near the northwest corner of the refuge; another will be near the east end of the sanctuary; and a third, between these two.

Later the Civilian Conservation Corps will make several ponds for waterfowl food plants and carry on other activities directly benefiting the birds. Now, however, aside from providing firebreaks, the camp is working for the most part to benefit the birds indirectly—by making it possible for the Biological Survey protectors to patrol the refuge more effectively and thus give better protection to the waterfowl that so much need such assistance.

The CCC workers are connecting this wild-life area with the outside world and providing foot trails within the refuge. Already they have established a telephone line to headquarters, and now, between the refuge headquarters and a State highway, they are building a two-mile corduroy truck trail across a swamp, using poles that they themselves have cut on the ground.

Other work carried on at Swanquarter includes cleaning up for fire prevention along the trails constructed, building a sea wall to protect the banks along Rose Bay from erosion, and improving the buildings and grounds at headquarters. When the Civilian Conservation Corps finishes its work on this area, Biological Survey officials believe that the refuge will be almost ideal for its purpose, from the standpoint of physical development.

Activities similar to those at Swanquarter have already improved two other sanctuaries in the East—the St. Marks Migratory Bird Refuge in Florida and the Blackwater Migratory Bird Refuge in Maryland.

Along the shores of Apalachee Bay in Florida, the St. Marks refuge comprises more than 35,000 acres of land and water used by ducks, geese and many species of shorebirds. Biological Survey officials consider the area especially valuable because thousands of geese frequent the refuge and graze on the grass-covered areas and rest on the sand flats in the midst of the large marshes. On this refuge a CCC camp between July 1, 1933, and March 31, 1934, constructed fourteen miles of truck trails and provided twenty-four miles of telephone line, thus establishing ready communication between the refuge headquarters, on the site of the former town of Port Leon, and the outside world and also between the headquarters and a refuge substation at St. Marks lighthouse, some miles away. For fire protection, the workers erected two steel lookout towers and cleared a mile of firebreak. They fenced and landscaped the headquarters site, planted shrubs and trees there, and made improvements to existing buildings and erected small structures required in the proper administration of the refuge.

On the Blackwater Refuge, near Cambridge, Md., black ducks and blue-winged teal use the marshes and waters as a breeding ground. (Continued on page 46)

SHELLS OF OUR NORTH ATLANTIC BEACHES

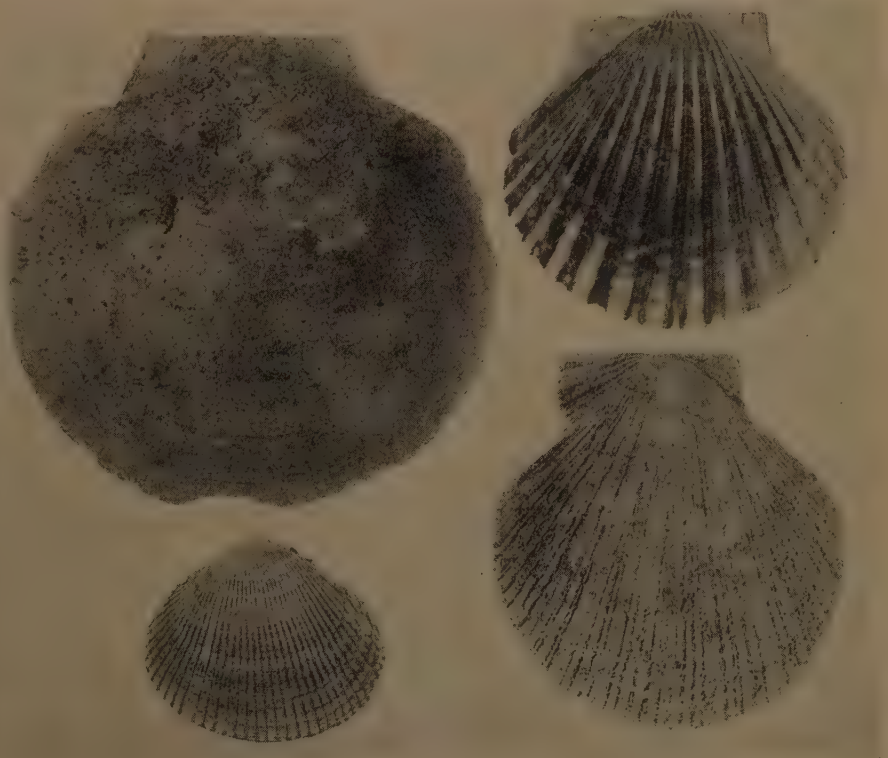
BY PAUL W. KEARNEY

PHOTOGRAPHS BY THE AUTHOR

WITH perhaps two exceptions, the color display of the shell collector's cabinet will not be improved by any amount of work along the northern Atlantic Coast. Apart from the scallops and the jingles (neither of which are exclusively northern), shells of this region are drab in appearance.

Yet the collector who has any sociological interest in how "the other half" of Mollusca lives cannot afford to pass up our offerings. Denied the balmy luxury of their southern neighbors, these cold water creatures forego the gaudy raiment which accompanies an idle existence and are content to blend with their environment in a valiant effort to avoid being eaten while they themselves search for food.

Lack of color, however, does not mean lack of variety. And even though the warmer waters are more populous, the coast line from Long Island northward will yield some forty different families of molluscs numbering, perhaps, 110 species, almost evenly divided between the univalves and the bivalves. Those who have roamed the Florida beaches and picked up different species by the handful will find the problem somewhat more of a test along the New England shore. The collector needs to be more than diligent: he must also have keen eyes. And if some of his antecedants were placer miners in the old gold rush days,



THREE SCALLOPS AND A COCKLE FROM ATLANTIC BEACHES

The largest shell is that of the Magellan scallop, Pecten magellanicus, found south to New Jersey. Beside it is the radiant scallop, Pecten irradians, found from Cape Cod to Texas. Below at the left is the Iceland cockle, Cardium islandicus, found south to Cape Cod and sometimes to Long Island. Finally the Iceland scallop, Pecten islandicus, found south to Cape Cod. In the strip at the left we have several interesting shells. Reading from the top down, we have the rock purple, Purpura lapillus, found on the entire coast; the grooved leda, Leda tenuisulcata, found in New England; the marsh snail, Melampus lineatus, common along the entire coast; the rough winkle, Littorina rudis, also found along the entire coast; the velum shell, Solenomya velum, found south to Hatteras; the dove shell, Columbella avara, found from Massachusetts south; the little chiton, Chaetopleura apiculata, found from Cape Cod south. This summer, at the seashore, keep a lookout for these.

that won't hurt him, either, because many of these specimens are so small that they have to be sieved out of the sand. He would best look first in the sea wrack piled up beyond the tide mark, for there many specimens are found.

Unfortunately for those who like to get things on a silver platter, the families numbering the most species seem to be the little fellows. The chink shells or *Lacunas* boast of about four representatives from New Jersey

A half-dozen interesting shells. At the top, left to right, are the American ark, Arca americana, found from North Carolina southward; the boat shell or decker, Crepidula fornicata, found on the entire coast; the rough piddock, Zirphaea crispata, found mostly in New England but also south to Hatteras. In the lower row, left to right, are the ponderous ark, Arca ponderosa, south to Florida; the worm shell, Vermetus radicula, Cape Cod to Florida; the inside of the shell of the rough piddock.

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In the strip at the left, from top to bottom, are the oyster drill, Urosalpinx cinereus, entire coast; the lash nassa, Nassa vibex, the entire coast; the ribbed drill, Eupleura caudata, south to Georgia; the dog whelk, Nassa trivittata, the entire coast.

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Below, beginning in the upper left hand corner and reading left to right, we have the little moon, Natica clausa, south to Cape Cod; Lea's lantern, Periploma leana, to New York; the jingle shell, Anomia glabra, (showing lower, concave valve); the flat boat shell, Crepidula plana, south to Texas; tooth shells, Dentalium entale, mostly in Maine but south to Cape Cod; the jingle, showing upper, convex valve most commonly found; Morton's cockle, Cardium mortoni, Cape Cod southward; the lined Pandora, Clidiophora trilineata, entire coast; oval rock-dweller, Petricola pholadiformis, found along the entire coast.

northward, ranging from one-quarter to one-half an inch in length. Most of the five ladder shells are one-half inch or less: the Astartes, also numbering five species, usually measure about the diameter of a dime. Often, of course, vast quantities of these tiny specimens will be found in a bunch—especially the dove shells in New England. But more often the chance hunter will fail to find even one. The *Turritella scicula,* for instance, (measuring about three-fifths of an inch maximum) is rarely picked up on the beach, the few specimens existing being taken from the stomachs of cod and other fishes.

As far as I am concerned, this simply adds zest to the business. After all, there isn't much fun in pouncing on a shell like the surf clam or the quahog when the sands are paved with them—but you do get a kick out of locating the only *Lucina* within five miles! It matters little that

These five shells are Thais lapillus, Cardita affinis, (at the top), Acmaea testudinalis and Canocardia morthuana, (below) and Buccinum humphreyanum at the right.

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In the strip at the right, reading from the top down, are the spiral shell, Spirula peroni, from Nantucket south; wavy top shell, Margarita undulate, in New England; chink shell, Lacuna vincta, south to New Jersey; the ladder shell, Scalaria lineata, the entire coast; the cup and saucer limpet, Crucibulum striatum, Maine to Florida.

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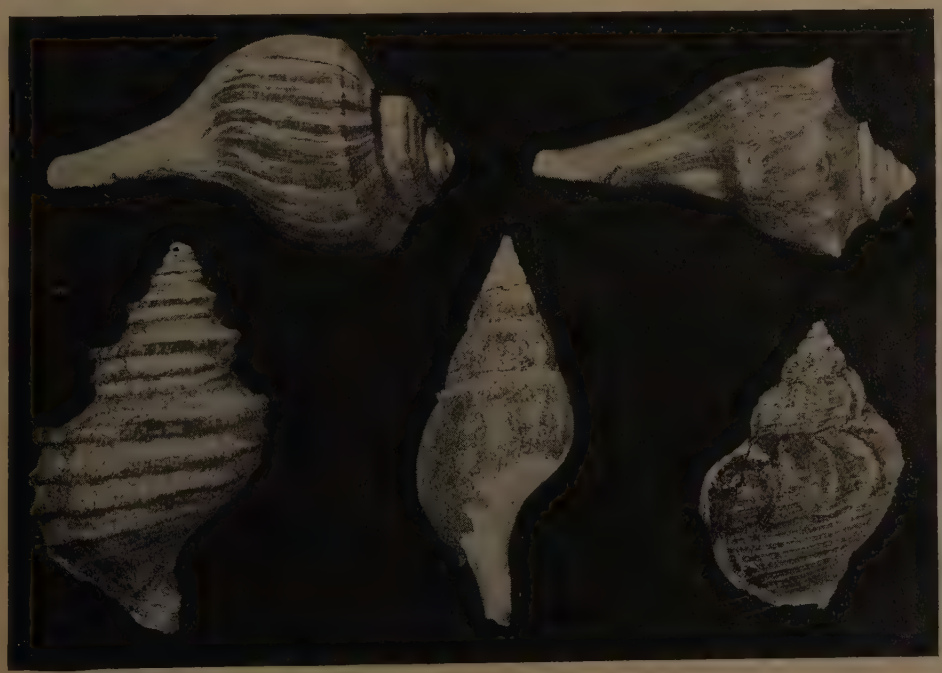
Below, the two upper shells are the channelled whelk, Fulgur canaliculata, Cape Cod southward; knobbed whelk, Fulgur carica, Cape Cod southward. The lower shells, left to right, are ten-ridged Neptuna, Neptunea decemcostatus, south to New Jersey; Stimpson's whelk, Sipho stimpsoni, south to Cape Cod; the edible whelk, Buccinum undatum, south to New Jersey.



Here, reading left to right from the top, are the file yoldia, Yoldia limatula, south to North Carolina; toothed lucina, Lucina dentata, Cape Cod south; broad yoldia, Yoldia thraciaeformis, south to Long Island; northern cardita, Venericardia borealis, south to New Jersey; the waved astarte, Astarte undata, south to Long Island; the chestnut astarte, Astarte castanea, south to New Jersey; edible periwinkle, Littorina litorea, south to Delaware; convex boat shell, Crepidula convexa, the entire coast; an exclusively Florida shell; and the basket shell, Nassa obsoleta, found along the entire coast of the North Atlantic

conchologists say the range is from Cape Cod to Florida —it's the only one I've found in three years.

Aside from comparative rarity, northern shells are frequently interesting because of their wide variety in textures and shapes. The tooth shells and the spiral are unique, the latter being a deep-water species almost never picked up alive. The little velum is odd, too, with its queer, brown "paper skin" extending beyond the lips of the shell proper. This is a fragile species deserving much better care than mine have received. Perhaps the widest range in textural differences is shown in the genus *Yoldia.* The delicate *Y. limatula,* with its file-like hinge line seems quite perishable as you look at its glazed, greenish skin: its cousin, *Y. thraciaeformis,* suggests an entirely different family, being heavy, bulky and more or less axe-shaped. For out and out fragility, however, the lined pandora easily takes the prize. This dainty little one-inch thing has valves almost too frail to cast a decent shadow and compressed so tightly that it is hard to believe an animal actually finds room to live between them. One trip to almost any sandy bottom around Cape Cod, however, will convince you that plenty of creatures find the abode satisfactory because they are plentiful there, and surprisingly agile.

In point of variety with regard to both color and shape, the abundant jingles lead the parade. You'll find them in all shades from white to black, the majority daintily tinted in lemons, oranges and pinks. And since their outlines are modified by the object to which they anchor, the choice of shapes is even less limited than the color range.

For beginners in this region one word of warning will not be amiss. The worm shell has a bad habit of breaking off its spiral tip in death, strewing it around in odd places just to bedevil the neophyte. When you find your first tip, check that quickening pulse, for you *haven't* spotted a specimen the books missed!

Beach-combing, of course, is the method followed by most "occasional collectors" who haven't yet gone insane over this hobby, and the most fruitful periods for them are immediately following a storm or during the low spring tides accompanying the new and full moons. The field can easily be enlarged by resorting to a dredge slung out from a boat off shore which will provide both living and dead specimens—and after one has toyed with a few live molluscs which he has never seen before, he is practically a full-fledged conchologist!

Without leaving land, however, there is plenty of variety available. The open, sandy beach is apt to be least productive: tide pools, rocky stations affording some shelter from the surf, quiet bays and inlets, salt marshes —all these harbor a greater number of species than are usually found on the sand beach.

Be that as it may, you are pretty apt to find shells of all kinds wherever you go. And although I have spent my whole life on the coast with considerable enjoyment of its natural wonders, I can truthfully say that I never began to get my money's worth out of it until, as a rank amateur, I began to pick up, admire and, eventually, attempt to identify some of the hundreds of shells that used to be thoughtlessly ground under foot. Remaining a rank amateur, it is still a pleasant diversion! I recommend it as a fascinating and healthful hobby for anyone.

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In this article the author has introduced us to a phase of the shore life of the North Atlantic. In the August issue Ward B. Holt of Los Angeles takes the reader along the shores of California, poking about under rocks and in tidal pools and there discovering a fascinating variety of shore life. Mr. Holt has photographed this life and his articles are vastly enhanced by these pictures.

DO FAIRIES DANCE IN YOUR GARDEN?

BY R. M. CARLETON

Here is a most important article for every gardener. Forsooth, how many gardeners realize that if any of the fairy folk are caught by the rising sun they must sleep all day beneath an elder bush as at the left? Mr. Carleton has delved into garden and flower lore and here gives us some hints on how to be sure of elves, sprites, leprechauns, gnomes and such in our gardens.

SOME great painter (perhaps it was Corot) was asked what he thought of the work of a talented student. Shaking his head sadly, he replied, "The lad paints fine pictures, but alas, the fairies don't dance in them!"

If pictures are better for fairies dancing in them, how much more important the little-people must be in gardens! For surely no garden can hope for perfection unless it is the rendezvous of all the wee folk for miles around. But how little we do to woo them. And how callous we are of their feelings. For instance, who has not deliberately walked through a fairy gate stretched between two rose bushes? And even people who should know better (such as mothers who read the most delightful fairy tales to their children) have been known to plant the malevolent wolfsbane that drives away the very little folk they wish to attract.

If you would make your garden a trysting place for all the fairies, leprechauns, gnomes, elves, sprites, pixies, hamadryads and kobolds who live near, there are certain plants which you must provide, others you must avoid, and certain precautions you must take to avoid fairy enchantments.

Perhaps the most important step is the planting of a Fairy Thorn, hawthorn *Crataegus oxyacantha.* A solitary thorn standing apart from the other trees on the grounds will immediately be taken over by all the little people as their personal property. In Ireland such trees, especially if they grow in sheltered hollows in the moorland, are so sacred that no peasant would dare to so much as pluck a single leaf, unless protected by a four-leaf clover or by the magic philter which I shall describe later. And what a lovely sight such a Fairy Thorn can be in spring, with its torrent of snowy flowers woven, the fairy folk say, from pure moonbeams! But take heed: never, never pluck a spray of bloom at night, lest you be pixy-led or elf-shot before you can turn around. Also, beware of approaching the tree too quickly at night. And be sure to whistle sharply before you reach it. Disaster and death have been known to visit those careless of their manners!

Next in importance to a Fairy Thorn is a Fairy Ring in which they may dance by moonlight. Sometimes these are formed by a special fungus, a mushroom which no mere human would dare to gather. However, if natural formation of such a ring is prevented, we must help our little friends by providing a man-made substitute. First of all, we fertilize a ring in the grass about six feet in diameter. This is then sown with fine bent grass. Mushroom spawn is then inserted at intervals and watered well.

THE SOURCE OF FAIRY GARDEN MUSIC
The sweetest in tone is the harebell, but, in a pinch the wee folk can do with Canterbury bells although they are really too heavy for all-night concerts

If the fairies approve of our handiwork (and if no malignant influences are at work) the mushrooms will appear late in summer, although the wee-folk will have taken possession as soon as the ring was planted. Beware of eating the mushrooms from such a ring—to do so will make you subject forever to Queen Mab.

Another important fairy plant is the foxglove, *Digitalis purpurea,* which is the source of many articles of fairy dress. Goblins use its bells for gloves, leprechauns make them into caps, while fairy ladies, always conservative in dress, find petticoats made from them essential to their modesty. Too, any fairy caught abroad at sunrise will hide deep in the throat of a foxglove bell, where he will leave those strange dots. To the knowing, these are fairy rubies or fairy charms. If picked off the petals these can be made into an unfailing beauty lotion which will restore even the most aged face to loveliness and youth.

Fortunate is he in whose garden grows the cowslip, *Primula veris,* because this flower is a charm so powerful that it may mean great wealth to its fortunate owner. A word of explanation of elfin cosmography is here in order. Many of the wee folk, as is well known, live beneath the ground during the day, coming to the surface only at dusk. Any so unfortunate as to be caught by the rising sun are turned into garter snakes and must lie under the shelter of a rosemary shrub or an elder bush until the sun goes down again. Hence the wee folk are careful to keep tight hold on the keys to magic wells through which they pass to and from their homes. These keys are made of cowslip flowers, and if by accident a fairy is frightened away before he can pluck his key, the lucky finder can open the wells and draw the magic water which will cure every known human ill. There is treasure also, so rich as to be beyond the imagination of prosaic folk unfamiliar with fairy powers. When combined with the sweet violet, the cowslip is an almost irresistible lure for fairy-people.

And of course, no garden can be complete without fairy music. For this purpose they need bells, and none is sweeter in tone than the harebell, *Campanula rotundifolia.* In a pinch they can do with Canterbury bells, *Campanula medium,* but these are really too heavy for all night concerts. Other flowers that are used for tonal variety are *Oxalis acetosella* and *Disporum hookeri.* Fairy pipes are made from bits of the stem of the elder, *Sambucus canandensis.* Since the berries of this shrub are also useful in philters against witchcraft, it serves a double purpose.

HAVE A CARE ABOUT THE PANSIES
It is a proved fact that if the fairies only rub the eyes of a sleeping maiden with this magic herb, the first person she sees on waking becomes her true love

I hesitate to recommend the planting of St. Johns Wort, *Hypericum perforatum,* since this is a magic flower of great potency. Should a careless stroller chance to step on it at night, he will be instantly snatched into the air and borne aloft on a fairy horse, to be released only when the sun has driven his captors back to earth. Nonetheless, this herb is sure charm against the machinations of wicked gnomes, particularly when gathered just before midnight on St. Johns Eve, June 23. However, since thistle seed buried to a depth of seven barley grains is just as effective perhaps one should depend on this less dangerous charm.

FOXGLOVE IS A SOURCE OF FAIRY DRESS

Goblins use its bells for gloves, leprechauns make them into caps, while fairy ladies are wont to fashion modest petticoats from them

If you own a cow, remember that she is much beloved by the wee-folk, and is considered by them to be their own property. (Look into her eyes and you will readily see that she is elf-shot.) To win their favor, and to draw her milk unmolested, tie a basket of strawberries between her horns in June. Another way to woo their favor is to plant the musk mallow for the fruits of this plant are fairy cheeses, an important article of diet among the little-people. Be sure to include a few plants of flax, *Linum catharticum* or *L. perenne,* so that they can weave their gossamer nets and filmy mantles. Too, remember that their babies must have cradles. While there are several flowers that will serve this purpose, preference should be given to pink or red tulips. Under no circumstance plant yellow tulips, for these are baneful and sure to be shunned.

Several plants are avoided by the denizens of Fairyland. Perhaps the most important of these is wolfsbane, *Aconitum lycoctonum.* The henbane, *Hyoscyamus niger,* is almost as deadly. In general they avoid yellow flowers, although the yellow cowslip is a prime favorite with them. Yellow roses are not repellant, since all roses are under the particular protection of all fairies. But beware of the flowers dedicated to the use of witches, or those favored by the Devil, for all wicked beings are the sworn enemies of the wee-folk. I know of a garden the fairies avoided for years, until its owner discovered that the so-called Chinese Lantern, *Physalis franchetti,* was actually the Devil's Bladder. Since eliminating this baneful herb, they have visited his garden all summer long, and every morning finds a fairy gate spun across the two rose trees that serve as garden portals.

For all their charm as unseen guests in the garden, certain fairy enchantments will need to be avoided. (When I say unseen, of course I mean to adult eyes. Children can see the fairies whenever they are abroad.) Never, never plant the opium poppy, in a garden haunted by the wee-folk. If you disregard this warning, you will surely be charmed away for a year and a day to toil endlessly at some menial task in a fay household. Also beware of cabbage stalks and senecios, for these, like St. Johns Wort, are fairy horses. Should you stumble over them in the dark you will be compelled to ride all night. This is what has really happened when you awake in the morning overcome by a strange lethargy, as tired as if you had never slept.

Another precaution is to refuse to listen to the baying of hounds late at night, for like as not, these are in the pack of the wild huntsman who is coursing the hamadryads who live in the trees during the day, but venture forth at night. I have it on excellent authority that a peasant, hearing this baying late at night, thoughtlessly mimicked the cry of the hounds. The next morning he found a quarter of a hamadryad hanging in his barn, his share of the hunt! His cry had confused the poor creature so that she fell easy victim to the hounds, and the cruelly honest huntsman had given him his share.

But above all, beware how you allow the little-folk to use pansies. Indeed, I would ban them absolutely were it not that I possess a philter against their power. Of all herbs, this is the most dangerous to loose on a civilization already fraught with entirely too many perils for poor Cupid. It is a proved fact that if the fairies only rub the eyes of a sleeping maiden with this magic herb, the first person she sees upon awakening will be her true love forever. So if these mischief-makers steal a march with their pansy magic, be not tardy in the morning.

And now for a final word of warning. Only two charms will enable you to view the festivities of the fairy dance without dangerous involvements. The first of these is a four-leaved clover. Lacking this potent herb, I can highly recommend the following philter, which is endorsed by no less an authority than the scribe of the Ashmolean MSS:

"Rx: A pint of Sallet-oyle, and put into a vial-glasse; but first wash it with Rose-Water and Marygolde-Water: the flowers to be gathered towards the East. Wash it until the oyle come white; then put it into the glasse, *ut supra:* and then put thereto the buddes of Holyhockes, the flowers or toppers of Wild Thyme, the buddes of young Hazle: and the Thyme must be gathered neare the side of a hill where the Fayries used to be: and take the grasse of a Fayrie Throne. Then all these put into the glasse: and sette it to dissolve three dayes in the sun, and then keep it for use; *ut supra.*" Thus all will be well.

SWEET GRATITUDE

BY ADA CLAPHAM COVAN

On October 30, the last purple finch of a flock of more than forty breakfasted with me and then departed for a more kindly clime. Since late April they had been my constant companions, and my hopes were high that they would return to me with the coming of spring. Later came news of violent storms and intense cold, even the southland being swept with its fury.

On December 18 a purple finch came to the windowsill as though she had never been away. Beset by cold and hunger, did she remember this sanctuary and return to take her chance with the northern winter? She rested for three days, disappeared for two, and returned with a companion. They stayed here two days, went away for three, and two others came back with them. In three weeks they numbered fifteen, and by the middle of January, that number was tripled. One morning when I looked out at the yard with its fresh white mantle, it seemed as though, during the night, a flower garden had sprung, full blossomed, from the snowy depths. Amidst the multitude of dark, bobbing heads, were fifteen that glowed like deep-hued roses, wine-red against the snow. In the bitter cold of near zero weather, many were standing, first on one foot, then the other, trying to coax a spark of warmth into their numbed toes, just as I have seen children do hundreds of times.

One January morning I stepped out on the porch to feed seventy-five birds awaiting their breakfasts. The sun was just crowning the hilltop, and bathed in its faint rays, a purple finch settled on an oak branch just over my head. As the first seeds dropped onto the feeding board, a shower of liquid melody poured from the quivering throat, and I looked up to see my finch—like a living jewel—singing the low, tender song of gratitude for the gift of his breakfast. A song, born of the barren days of cold and hunger, when he and countless others like him came to know me as their friend. Lustrous eyes fixed earnestly upon me—the glory of his crested head blazing like a diadem in the morning light—the glowing beauty of the bird, together with his gracious and lovely tribute to his friend, made me realize that not even the rarest migrant of the springtime could hope to compete with the purple finches that had already returned.

FIGHTING EVER UPWARD TOWARD THE SALMON SPAWNING GROUNDS

The jumping of the Chinook as he battles the swirling white smother of falls and cataracts in response to the urge to carry on his race is something to stir any imagination

CHINOOK

THE STORY OF THE WONDER FISH OF THE WEST

BY HAMILTON M. LAING

IF THE Chinook salmon, that king of his western tribes, were given to verbal expression he might say of his kind as did the Twin Gods when questioned as they appeared to hearten the ranks of Rome: "By many names men call us; in many lands we dwell".

This fish is known variously as Chinook, Spring, Tyee, Quinnat and King; all according to the geography in the case. His vast range includes the circle of the north Pacific: Kamtchatka, Alaska, the Aleutian Islands, British Columbia, Oregon, Washington and California. His scientific name—*Oncorhynchos tschawytscha*—savors of the Russian; in Alaska and the Aleutians he is the "king"; British Columbians almost invariably call him "spring" and in the northwestern states he is "Chinook". Throughout his vast range he plays many a rôle: a red-fleshed food staple going to all city market stalls or into tins to figure in those commercial statistics of the salmon pack; a fighting little giant making sport for many a light tackle enthusiast pulling his lures through inside waters, or bending the outrigger poles of the commercial gas-boat fisherman; while on his last pilgrimage, a great King or Tyee is a fifty-pound leviathan bringing sportsmen around the world for the sake of his capture; a leaping wonder of brawling white water—champion finny athlete of western waters; an example of one of the strangest stories of reproduction and saddest final chapters of a life history that Nature can show.

Western salmon, of which there are five species in the waters of the north Pacific, are anadromous, which means that the parent fish run up the streams from the sea to spawn. So young Chinook, born in the gravel of inland stream, early starts out on a life of adventure. By the time as a fingerling he has run the down-stream gauntlet of danger—big trout, snakes, mergansers, kingfishers and such folk that love fingerling fry—he merely exchanges one set of dangers for another. His early career in salt water seems rather a dark chapter in his life, but it would seem that much of his adventurous life is spent not far from shore and most of it probably in the vicinity of the home stream to which later he is fated to return.

In the bays and protected waters where these little "grilse" spend their youth we see a trifle of their activi-

A TRUE KING OF HIS FINNY RACE

A great Tyee weighing forty-six pounds; a fish for whose capture fishermen yearly travel half-way around the world

ties easily enough. They behave like their more aristocratic relatives, the true trout, and many are taken by fishermen on the fly as "sea trout". Your little silvery jewel of a fish rising with a wondrous flip to shoot four feet almost perpendicular into the morning sunlight—a mighty leap for so tiny a fellow—like as not is a baby Chinook in play rehearsing some of the things he will do later in the strength of adult years. His days now are occupied with getting plenty to eat; his appetite and ambition are attested by the fact that several times one has been seen by the writer caught on the huge metal lure with five-inch blade trailed in quest of his great papa, the Tyee.

But how this fingerling grows! Starting from scratch as a mere inch-long minnow, in four years he must be mature and the giant of his kind. Early—doubtless in his second year—he forsakes the shoreward waters to pursue the herring shoals, and from now onward he reaps a fat harvest and waxes sturdy and strong, doubling and trebling his growth yearly. Doubtless his stirring life grows tamer with the years; yet even as the great king of salmon in the height of his strength he must keep a wary eye for the swift harbor seal that loves to rend his rich pink flesh. Sometimes he is taken with the fresh wounds of raking teeth across his side or great scars of savage wounds that healed.

In the matter of size and poundage the Chinook shows us an example of that strange thing so well known of trout wherein the fish of this or that stream are consistently large or small. Thus on that famous fishing stream, the Willamette in Oregon, the average weight of Chinooks is only a matter of twenty odd pounds. In the Tyee Club waters about the mouth of the Puntledge and Campbell Rivers of Vancouver Island, the average is at least ten pounds heavier and fifty pounders are scarcely local news. Northward, the Kings of Alaska are larger still and have been taken by commercial fishermen even with the stupendous weight of more than one hundred pounds!

Yet the explanation may be simple enough. Quite aside from the fact that the northerly branches of the family are larger and that certain individuals are bound to find better feeding grounds than others, there is this to consider—a fish grows as long as he is alive, not halting suddenly as birds and mammals do. Also these salmon normally mature in their fourth year, returning then to spawn and die in the stream of their birth. But there are innumerable examples of non-breeding birds and mammals every year and it is hard to believe that fish do not come under the same rule. Thus when a Chinook, missing his due season to spawn, returns in his fifth year, he must be far above the average of his river and if for some reason he lags a second or third season, he may come to some lucky fisherman's gaff as one of those almost unbelievable little "whales" of salmon more than one hundred pounds.

How do we know the age of fish? Much has been done by tagging fry, getting their story when they return to home waters, but science has another way. It has been found that under the microscope a fish scale tells a story of years somewhat as it is told on a cow's horn or a mountain sheep's horn, or in the rings of a tree or the shell of an oyster—by a succession of rings. In the case of the fish scale however, a single ring does not denote a year; rather are the periods separated by a density of rings at intervals as weather or climatic cycles show among the annular rings of a tree.

There is a good deal about this salmon that we associate with the springtime. They are heading up the mighty Columbia and some of its tributaries at the time the geese are passing northward and the trilliums are in bloom. They are pursuing the migration of herring in March and April into inside waters of the British Columbia coast—doubtless this is why in this region a Chinook is almost invariably called a "spring". The Columbia River fish at that time are on their up-stream pilgrimage and have no more interest in finny fry. Those that chase the herring then belong to runs that go later to other spawning ground. To every coastal fisherman herring and springs are in the same thought. "No herring no springs" is the word. This really is only partly true because small runs of these fish (Chinooks) are found locally at all times of the year and in pursuit of other fry.

Yet though this fish may be a "spring", and in some

streams start as early as the first of March for his spawning ground, he is really a spawner of the autumn and often quite late at that. His adaptation to his chosen stream is a strange thing and shows that his race must be split into a great number of clans, each clan to its river. Each race is governed in its movements out of salt water by the time at which its chosen natal river is in condition for egg-laying—this last depending not alone on water-level but on temperature. Thus in the Columbia the fish that first come upstream in March may be starting on a wondrous migration of weeks and months to reach the spawning gravel-beds in the head waters of the Snake and Salmon Rivers of Idaho. Then in September another run is entering the lower Columbia for a destination only a hundred and fifty miles inland at Eagle Creek. Again the big race of Tyees entering Campbell River on Vancouver Island are but an hour's run from their gravel-bars and such fish find August their right month, while only thirty miles southward in the Puntledge these big fish hold back three or four weeks and do not finish running till early October.

It is this variety of the Chinook or Spring or Tyee that makes the fish of mighty interest to sportsmen—a year-round possibility for rod and lure. There really are two types of fishing, one in fresh water; the other and commoner, in salt. About the former there is much mystery and speculation. Chinook in salt water is a hungry, feeding fish; while he is in fresh he has no use whatever for food. By the time he ascends the river mouth his stomach has ceased to function. Then why does he strike at the spinning lure in such waters as the Willamette, ninety miles from the sea, or why in the salt water at the mouth of many streams does he lunge at the lure? Why this when his stomach has become a quite forgotten organ, the whole body cavity packed instead from gills to outlet with the huge roe of large-sized eggs in the female or similarly distended milts of the male?

The best explanation of this would seem to be that when these mature fish, filled with the new lust of life that comes with the mating instinct, approach their spawning ground they are intolerant of other fish near them. They pair off much as birds do and go up the stream together. Smaller fish, such as steelhead trout that eat salmon eggs, are hereditary foes. Thus the Chinook in certain places, as near gravel-bars, is on his mettle, jealous and savage against intruders; he is easily annoyed and so the flashing metal spinner or wobbler is his undoing just as the same lure might be in his hungry days out in the green waters of the ocean.

No stranger pilgrimage of a creature than the upstream march of Chinook can be found in all Nature. The wondrous instincts that govern him so surely, bringing him back after long journeyings to this stream of his birth; the marvellous vitality of a creature that can work a thousand miles upstream on an empty stomach, overcoming almost insurmountable obstacles en route and still arrive after months of wear and tear fit for the purpose back of that struggle—it would seem almost beyond comprehension until one has seen the miracle.

A SALMON POOL OF THE CASCADES, OREGON

Splashes may be seen upon the surface of the water and these mean fish at play. In such spots Chinook is born in the gravel

The swimming and jumping of Chinook in the swirling, white smother of falls and cataracts is a thing to stir any imagination. To see the leap of the salmon has, to many an easterner, been one of the worthwhile things of the west. A study of this creature in the water shows that he has mastered his element even as the gull has mastered the air. Our great salmon is heavier than water—when dead he sinks at once—even as the bird is heavier than the air, and if his fins are only rudimentary wings, he uses them much the same, and in his mighty tail is the strength of spring steel to drive him like a torpedo or toss him high into the air above the swirling currents. There is every reason to believe, too, that he has the same mastery of currents as the bird has and just as the gull can fly easiest against the opposition of the wind, so Chinook by his fins and body surfaces makes the current propel him UPSTREAM!—strange and paradoxical though this may seem.

His manner of boring into rushing green water in an easy effortless way is sheer magic and perhaps can be explained only as above. And his leap—less magic in it, perhaps, and more sheer muscular strength, but spectac-

ular at least. Confronted by a wall of apparently impossible water, he rolls and rests in the eddy below and then suddenly flips into the air—three, four or even five feet. Again and again with the blind courage of a bulldog he will try and try the face of impossible falls. If there is a way that was traversed by his fathers, he too will find it or perish in the attempt.

Although he has an interesting time in any phase of his life, Chinook doubtless finds his first year as a fingerling, and his closing month or months the time of his greatest adventures. There can be no doubt that his up-stream pilgrimage is to him the real climax of life and fraught with joyous peril. Brimming with strength and ambition he comes in from the sea, his color bright, his flesh red and full of rich oil that, like the bear's winter fat, is his sustaining fuel when no food is eaten. Watch the great Tyees playing at the river-mouth as they accustom themselves to fresh water—leaping high, rolling, swirling about in pairs, full of a joyous sense of abandon. Danger on every side but mostly scorned—the shining lure of the angler; the swift deadly speed of the harbor seal; the disgusting lamprey that follows to fasten upon him and suck his blood and leave a sore upon his flesh; the otter, swift death, that haunts the resting pools; the bear, cunning fisherman that watches the shallows; the eagle with his gaff-hooks keeping vigil over the riffles. What predatory animal or bird does not love to rend a salmon?

MALE AND FEMALE CHINOOK AFTER SPAWNING
Blotched and bruised, scales and skin gone in patches, fins frayed, they have performed the sacrifice Nature demands

But what a cruel fate Nature holds in store for him when he wins his up-stream struggle! Death is his only reward; he belongs to an army where in the battle every warrior is foredoomed to die. To human eyes the spawning ground is a great tragedy. No one now would recognize the fish that came in from salt water. Gone is all his beauty. Black, and blotched white and red, his skin and scales gone in patches, his fins frayed, his nose hooked and mouth bearing the teeth of a carnivorous brute—this especially true of the male—he is a truly pitiable spectacle. Shortly after the pair have scraped out their "nest" in the gravel and left their fertile seed covered safely, they are veritably death alive: creatures that might have lain wasting ashore suddenly revivified to wriggle feebly in the current till life goes out. Such is the price Nature demands of this noble fish, and such he pays gladly that his race may survive. And so wasted and spent, he wiggles feebly, master of his element as long as he has life, a king still despite his pitiable fall; and the closing scene of this last tragic chapter has to do with the ghoulish rites of scavenging gull and crow and raven that come to clear the stream and fit it again for a newer sacrifice in the year to come when other salmon fight their way from the sea.

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Many of the readers of Nature Magazine have expressed the wish that we would use a heavier cover for the magazine, one which would better stand the wear and tear of frequent handling. Many of our readers of long standing have urged us to return to the type of cover used in the early years of the magazine. In deference to these wishes—which have been so continuous and considerable that they indicate a similar although unexpressed desire on the part of others—we will adopt a new cover policy with the August issue.

A CHARMING SPOT FOR LUNCH ALONG THE APPALACHIAN TRAIL

And how good it tastes after a morning of sound but steady hiking through the forest and along mountainsides giving ever-changing panoramas

WHAT IT TAKES TO HIKE

BY ERNEST A. DENCH

This is the second of three hiking articles by Mr. Dench. These are published in recognition of the rapid increase in hiking activity and the national interest in this constructive use of leisure. The editors of Nature Magazine are also interested in obtaining the reaction of their readers to the need and advisability of inaugurating a hiking department in the magazine as a means to providing a forum for the exchange of information and hiking news. Let us know if you'd like this.

"WHY walk when you can ride?" asked a motorist as he overtook a neighbor.

"Read this and learn why," was the pedestrian's smiling response. He quickly produced a mileage record card issued by a life insurance company. The motorist glanced at the card. It said that walking "strengthens the bones, hardens the muscles, loosens the joints, benefits the heart, enriches the blood, speeds up a lazy liver, promotes deep breathing. It improves the figure, maintains normal weight, tones the nerves, sharpens the wits, improves the complexion."

"Sounds good; must try it sometime," said the man behind the wheel, and drove on.

Few city dwellers tabulate the mileage they do in the course of their daily routine indoors and out; it is too fragmentary to keep track of.

The other extreme is the case of a hardy hiker, who, in his younger days, tried the record-breaking achievement of covering every street in a large city. He painstakingly went through the city street guide and checked off each thoroughfare after he had walked it. Sundays and holidays his pencil was kept busy from morning until night. Several years later, when there were no virgin streets left, the expected thrill did not quite materialize. True he had remarkably good health and a pencil-checked book from a to z, but his cup of contentment was but partly filled.

In such places walking cannot become much more than the function of "lifting 'em up and putting 'em down." Then, too, the even monotonous tread on macadam or cement is tiring because it employs only one set of leg muscles. There is no change or relief as on woodland paths, especially rough and hilly ones. The uneven condition of the ground brings all leg muscles into play during the course of a long tramp.

The city walker is deprived of the esthetic pleasures essential to a well-rounded spiritual development. Were hiking wholly a physical reaction, our native wilds would receive few visitors. In this mechanical age man develops into a semi-suppressed rebel. His birthright—close association with Nature—is taken away because the business of living confines him to the city the greater part of the

SLEEPING BEAUTY ON A ROCK
White hair, however, is no measure of the ability of the hiker to keep the pace

week. An escape is possible only on leisure days. Individual preferences, such as fishing, hunting, camping, hiking, gardening, picnicking, botanizing, or canoeing, determine how he returns to a semblance of the pioneer man.

What, then, are the esthetic rewards of hiking? There was a business man whose health was poor through lack of an outdoor hobby and the physical exercise it would give him. His best friend was a seasoned hiker. He envied him not so much for being the picture of health but for his perfect contentment with life. "What makes you feel at peace with the world?" the indoor man finally asked. "It's quite simple," replied the hiker. "It is because I am equipped with a pair of robust legs and a sound heart to view Nature in her unspoiled and wildest moods. I likewise own a pair of satisfactory eyes to absorb the glories of the hilltops. I have a nose with which to catch the delightful perfumes of Mother Earth and her many assistants. My ears register the bird melodies. Deprive me of these physical assets and my spiritual cup would be drained of all its pleasures."

Now for two true episodes of the physical requirements of hiking. They will disclose, in turn, the wrong and the right way to make a start.

First, the wrong way. A young woman was fascinated by the opportunity to climb the 4204-foot mountain of a distant range. She persuaded a masculine friend to vouch for her fitness to the club sponsoring the overnight trip.

After making camp Saturday afternoon, the party explored a disappearing waterfall novelty on the lower slopes of a minor mountain. Although the physical exertion was moderate, the feminine novice complained of a splitting headache.

Sunday morning the party left camp for a strenuous tramp of about twenty-three miles, making a circuit of the three higher peaks. It was obvious, before she was half way up the first mountain, that the young woman was hopelessly out of condition. Again she mentioned the headache. When it was evident that she could no longer drag her feet upward, her masculine friend wisely suggested she return to the camp. She gratefully accepted the offer. The man made a bigger sacrifice than perhaps she realized, for this was his first trip here. He partly consoled himself by fishing in the nearby creek. Both were wrong—the young woman for undertaking such an arduous venture, and the young man for approving of it.

It so happens that this club schedules only three overnight trips of such strenuosity during the year. Most of the time it concentrates on nine to twelve mile hikes in its local terrain, where the mountains average about 1000 feet. The young woman should have first participated in some of these moderate trips, and thus gotten herself into physical condition for the strenuous ones.

Second, the right way. I know a young married couple, both excellent hikers, who had a relative anxious to accompany them. They patiently broke her in on a number of trips, deliberately placing her in the lead along a well-marked trail. She could then set the pace to suit herself and adjust herself to the increased exertion required in reaching the uplands. During the first few trips the beginner was equal to a half day's walk. She complained of aching feet and being out of breath. When these physical defects disappeared, the distance was gradually increased until she was able fully to enjoy a whole day following woodland paths.

Although another young woman makes no pretensions at being a speed hound, she detests being with friends who proceed at a snail's pace in level country. It fatigues her far more than a longer trek taken at a brisk but not rapid gait. A. J. Brown, the English moorland tramping authority, has a name for these slowpokes— "strollers". He rightfully declares that the "stroller saunters rather than walks. The fierce delight of vigorous heel and toe is unknown; he moves along in a semi-comatose state, oblivious of the lurking electricity in his legs and the amazing resilience of his soles."

Watch the good walker with his even strides and how he elevates himself on the balls of the toes. Notice, too, that he swings forward the shoulder opposite the advancing step as he makes every step. There is a simple knack.

Age has little to do with the ability to walk. In many of the hiking clubs, the best on their feet are men and women in their fifties. They leave the waste motions to the more energetic young folk who unconsciously play to the grandstand with their energetic swinging of arms and ultra-long steps. No rest periods for them; the hill must be completed in one unbroken series of leaps or not at all. Youth lies temporarily exhausted on the skyline while wiser middle-age devotes the rest period to the esthetic enjoyment of the glorious scenic panorama.

A regulation hiking pace under all conditions is unknown in club circles. It probably always will be. After all, a wilderness hike is not a highway marathon. The average hiker is an ardent lover of Nature.

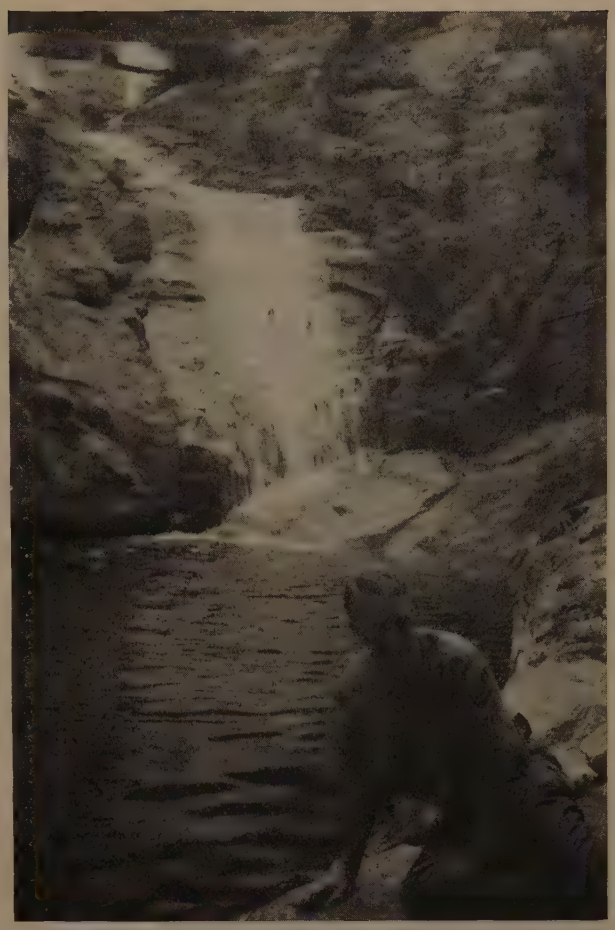
The perfect countryside gait is one adapted to the character of the terrain, the season and the prevailing weather. On a cold winter's day the bracing air will accelerate the hiker's gait during the first two miles. He has now acquired a comfortable body warmth, and will automatically reduce his speed. The other extreme is a hot summer's day, conducive to leisurely movements.

If the novice is anxious to learn from the veteran, the following tips will prove helpful:

Try to arrange the trip so that the hardest stretch occurs in the morning, when one's energy is undiminished. The hiker who delays his start until late morning or early afternoon loses some of the health benefits attributed to the sunlight's violet rays. They exist in northern climes between nine and three o'clock in summer, and from eleven to one o'clock in winter.

It is best to take a steep hill or mountain at a slow but even pace. Pretend you are stepping out to music—a slow waltz in preference to a fast fox trot—and you will soon acquire a sense of rhythm, and then the all-essential measured tread. If unaccustomed to climbing, a two-minute rest every ten minutes will prove desirable. Two short steps are preferable to one long step. This likewise applies to the later descent.

The hiker expects his quota of falls and tumbles, most of which will be confined to scratches and minor bruises. A serious accident can generally be averted by employing what is known as the stage fall. Relax instead of offering resistance. A baby tumbles a lot, yet usually contrives to remain unhurt. It falls as if that were the natural thing to do, relaxing in so doing. Immediately the average adult slips down, he or she fights the act with tenseness. The injury is then liable to be serious.

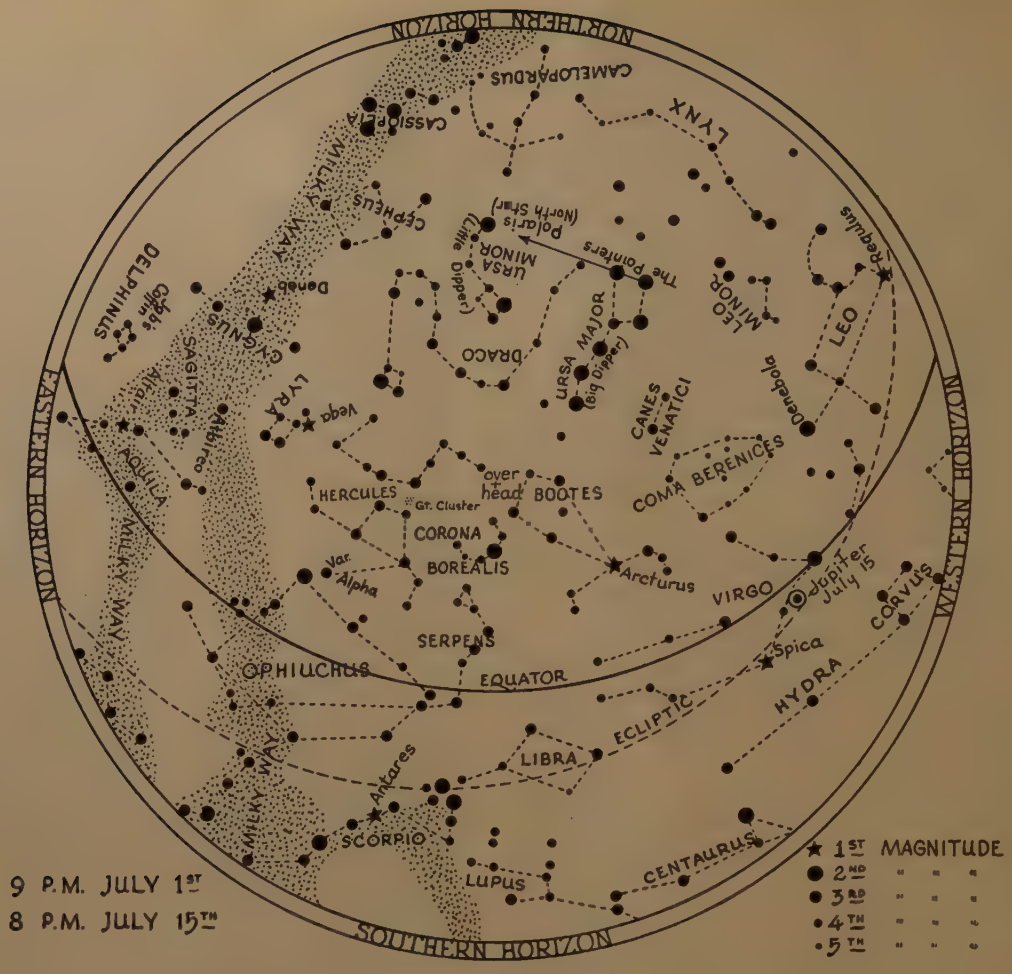


AT WHITE OAK CANYON IN VIRGINIA
One of the beauty spots along the trail sponsored by the Potomac Appalachian Trail Club

The writer's falls always prove comical to the bystander, as if I were to out to enjoy myself. But they are relaxed.

We pity the hiker who lacks a sense of humor. With it one can joke about the inevitable hardships, which are never on the schedule. The unexpected drenching in the rain; the ploughing through deep, hard snow; combats with thorns and brambles; an involuntary fall into the creek; the lunch left behind at home; the blister that develops; the missing of the last train or bus home—all are possible minor tragedies best met with a gurgle.

A HIKING GROUP
Officers and delegates to the 2nd annual convention of Western Outdoor Clubs held at Mount Hood, Ore.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

EXPLORING THE MILKY WAY

BY ISABEL M. LEWIS

SEEN from city streets under the glare of artificial lights the Milky Way is a disappointment. In fact, it is generally not visible at all under such conditions. But viewed under a moonless sky in the country, by the seashore, or above a vast expanse of ocean, desert, or prairie, the Milky Way, or Galaxy, as it is also known, is the most awe-inspiring sight in the heavens.

The Milky Way occupies a position of fundamental importance in the structure of the heavens. What the ecliptic is to the solar system the Milky Way is to our universe of stars, which is known as the galactic system. It apparently encircles the heavens in an irregular belt of densely packed stars that are so faint, chiefly of tenth and twelfth magnitudes, that they are not visible individually to unaided vision, although their combined light produces a misty luminosity that seems best described as "milky". In the northern heavens the part of it that is visible on winter evenings passes through the constellations of Cassiopeia, Perseus, Auriga, Taurus, Gemini, Monoceros, Canis Major, to Argo Navis, on the southern horizon, where it passes from view into the southern hemisphere. This portion of the Milky Way, which arches high across the heavens in midwinter, is narrowest in Taurus, brightest in Perseus, faintest in Monoceros. As spring comes on it drops toward the western horizon, and, in the early evening in May, lies nearly on the horizon. This is the least favorable time for observing the Milky Way in the evening in the northern hemisphere. Autumn is the most favorable time because then it rises almost perpendicularly from the horizon.

By July another portion of the Milky Way with which we are familiar in summer and fall comes well into view in the eastern sky in the evening. We may now trace it from Cassiopeia into Cepheus in the opposite direction from the winter branch, through Cygnus to a point near the base of the Northern Cross, where it separates for

about one-third of its entire length into two parallel branches, one passing to Scorpio through Sagitta, Aquila, and Sagittarius, and the other to the same constellation through Ophiuchus. This dark rift in the Milky Way is one of its most conspicuous features. It is uncertain whether it represents a true bifurcation of the Milky Way or vast nebulosity, non-luminous and comparatively near, that hides the light of more distant regions of the Galaxy.

In the northern hemisphere the Milky Way is brightest in Cygnus and Aquila, but it attains its greatest splendor and brilliancy in Sagittarius and Scorpio, constellations too far south to be seen at their best in this hemisphere. Some of the most beautiful and interesting regions in the Milky Way, and the most complex and diversified in structure, are to be found near the Southern Cross and in Argo Navis. From Scorpio and Sagittarius it passes through Ara, Lupus, Norma, Crux and Centaurus to Argo, and then northward once more into the northern hemisphere in Canis Major completing its circuit of the heavens. In Argo its path is completely severed by a dark rift at one point, while below the Southern Cross lies the famous coal-sack, apparently inky black by contrast with a background densely packed with stars, though against the average stellar background it would be unnoticed. There are many such dark holes and streaks in the Milky Way. They are believed to be dark, gaseous nebulae projected against a brilliant background of stars.

Many years ago Sir William Herschel recognized the fact that the Milky Way played a fundamental part in the structure of the heavens. Discoveries of modern times have confirmed this view.

The great majority of all the stars in the heavens crowd toward the Milky Way. Star counts have shown that there are fifty times as many stars per square degree in the Milky Way in Cygnus as in a region of equal area near its pole in Coma, and about three and one-half times as many as in an average region of the sky. Although there is considerable uncertainty as to how great in extent the Galaxy may be it is estimated that its diameter longitudinally is fully twenty times its width. According to the estimates of Shapley, the Milky Way has a diameter of about 300,000 light years and a width of less than 15,000 light years. Its center lies in the constellation of Sagittarius about 60,000 light years from the sun, which is situated north of the central plane of the Galaxy within a local cluster of stars some 3000 light years in extent which includes all the brightest and nearest stars especially the "Orion stars". This local cluster is inclined at a small angle to the plane of the Galaxy so the sun does not lie far above this plane and is a star of the Milky Way. The density of stars along the Milky Way is due partly to an actual crowding of stars toward the galactic plane, and, partly also, to the fact that in that direction we are looking through greater layers of stars. Therefore the stars appear to be more closely crowded together than they are.

Certain types of celestial objects, including novae, planetary nebulae, gaseous and irregular nebulae, such as the Great Nebula in Orion, and open clusters of stars, such as the Pleiades, favor the galactic regions. Other classes of objects, such as the globular star clusters and the spiral nebulae, lie far exterior to it, or even avoid it.

The globular star clusters, which consist of thousands or even hundreds of thousands of stars forming compact groups in globular form, lie at distances ranging from a few thousand to more than a hundred thousand light years. They are symmetrically distributed above and below the plane of the Milky Way. A noted example of a globular cluster is the Great Hercules Cluster, which is over 30,000 light years from the earth. The spiral nebulae also lie far exterior to the Milky Way and are found in greatest numbers around its poles. They are at distances of millions of light years from the Galaxy and are, with few exceptions, receding from it at high velocities.

It has long been suspected that our Milky Way aggregation of stars is a spiral nebula in form like the spirals that lie far from it and are so frequently referred to as "island universes". It is known that the Milky Way has no central sun, as was once believed by some, and also it is known to be in rotation. If the Milky Way is a spiral nebula it is, if the dimensions given are correct, far greater in size than the spirals exterior to it, which have, at the most, diameters less than a tenth as great. Either the estimates of the Galaxy are too large, a question with which astronomers are now concerned, or our Galaxy far exceeds in size all others known.

Jupiter and Saturn are now well in view in the evening sky. Jupiter will be in quadrature in July 6, when it will be due south at sunset. It will be found in Virgo a few degrees northwest of Spica. Saturn is in Aquarius and rises about two hours after sunset. Venus is now a fine morning star in Taurus. Mars is near Venus in the morning sky but is too faint to be seen to advantage.

Mercury is in inferior conjunction with the sun on July 11 and reaches greatest elongation west on July 31, when it will be in the morning sky before sunrise in the northeast, but it will not be favorable for observation.

On July 26 there will be a partial eclipse of the moon which will have a magnitude of about 67 per cent, that is this proportion of the moon's diameter will be covered by the earth's shadow at maximum. The beginning will be visible in the western part of North and South America and the Pacific Ocean, and the ending will be visible in the extreme northwestern part of North America and the Pacific Ocean. The moon will enter the earth's umbral shadow at 2:54 A.M., Pacific Time, and will set eclipsed. The maximum eclipse is at 4:15 A.M., Pacific Time.

The Astronomy articles by Mrs. Lewis have been a continuous feature of Nature Magazine for many years, and one of the most popular. We would now like to call upon our astronomer readers for some editorial advice. What other subject in the field of the heavens would they like to see covered in this department? Have they any suggestions as to how this monthly article might be varied?

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MUSSY WENT BACK AND FORTH FROM SCHOOL IN A BAG BUT HE SOON LEARNED HOW TO GET OUT OF IT AND TO FOLLOW ON FOOT

BADGERED

BY ELMO N. STEVENSON

WHY he was called Mussolini, no one knows. Perhaps it was because he did just as he pleased, and most of his wishes were obeyed. We had not known him long, however, before the name was cut to Mussy.

It was early in April, and we were driving through the semi-arid region of southeastern Washington, near the Columbia River, when we first saw him. Mother badger was moving her family in broad daylight. With one furry ball in her mouth, she trotted down a canyon not twenty-five feet from the public highway.

"What a rare addition to the family album this will make," we thought, but she did not want to have her picture taken. She dropped her cub and bared her teeth, her grizzled hair standing on end. Then she turned and fled for her hole, some twenty yards away. In a moment the hole was filled with fresh dirt. That is how Mussy was introduced to the ways of man.

As he crouched there on the ground, shivering and crying, we debated whether the old badger would return for him or not. We wondered what sort of pet a young badger would make. We finally decided to adopt him, and when we put him in the warm car, he seemed quite happy.

To get Mussy to eat was at first a problem. He could not lap his milk from a saucer. He would have nothing to do with a bottle and nipple. At last a medicine dropper and brute strength forced him to eat. Then he began to grow. Later on, fresh raw meat was added to his diet. Only once did he try to eat anything besides meat, milk, eggs and butter. That time he tried a cinnamon roll, but he had to take his claws and dig it from the roof of his mouth. It had packed there in a doughy mass.

During the first few weeks with us, Mussy went back and forth from home to school in an old handbag. It was not long, however, before he found that he could climb out of this. From then on he tagged along wherever we went, like Mary's lamb. When he was about two months old, he could climb into and out of the automobile. When he was in the garage, where he slept, and heard the car coming, he would run to the door, out to the car and climb in to ride back.

He seemed to enjoy riding if he could get his head and most of his body out of the window. He

would brace his hind legs and let two-thirds of his body sway back and forth. If we rounded a sharp turn, Mussy would quickly scramble back to safety. Long rides or many curves made him car sick.

Mussy liked water. When the weather was hot he sometimes went swimming three or four times a day. The first time he swam was when he waded out beyond his depth while getting a drink. He acted as if he were frightened, swimming quickly for shore. Then he rolled over and over in the dirt. He looked strange with his thick fur clinging closely to his skin. He appeared to be all head. After a few minutes he shook himself. The result was a complete surprise. His fur was clean and fluffy. From that time on he swam whenever he had the chance.

HOLES AND MORE HOLES WAS MUSSY'S SLOGAN. BELOW WE SEE HIM AS HIS MOTHER LEFT HIM

Some books say that badgers are a pest because of the holes they dig. Mussy dug and dug, not one long hole, but dozens of short ones. First he sniffed at the ground. Then his long front claws made a hole large enough for the end of his nose, which grew sharper as he got older. When this was done, he braced his head against one side of the hole and dug furiously with his front feet. His hind feet kicked away the dirt. Every few seconds he came up for air, snorting and showering drops from his ever-wet nose. In a few minutes he tired of this, but soon had another hole started elsewhere. Sometimes he came back to enlarge old holes. Whenever he dug in wet dirt, he was careful to clean his nails! He used the claws of another paw to do this.

Interesting as he was, Mussy was a pest in other ways also. He refused to be house broken. He was not affectionate, yet he walked over people's laps —in the car—and playfully bit their legs. As he grew older, one had to be careful about touching him suddenly. His teeth were long and sharp. He had no fear of anything or anybody, so the neighbor's dogs led a hard life. He had a bad habit of smelling people's feet. If he didn't like them, he backed away, fur standing on end.

When he wasn't digging or eating, Mussy usually slept or played. Most of his sleeping was done at night or after many hours of exercise. His favorite position, which he always took during sleep, was on his back, with front paws bent prayer fashion on his chest and the others straight out behind. His play was practicing with powerful jaws and teeth. He would rear up on his hind feet with teeth bared, snapping and catching at whatever might be in the way. Then he would gallop off a short way to repeat this. Sometimes he rubbed his fur against our legs and purred, cat-like.

Mussy was taught one trick which always pleased his audiences of young folks. He would roll right over for a bite of meat.

Our badger was a veteran camper. He stayed around close and dug holes until one day—he didn't. We couldn't find him anywhere. Now he is gone, but not before he made a name for himself in the town! He had been to school daily for four months, more as teacher than student. Hundreds of children had learned the ways of *Taxidea taxus neglecta,* as they loved to call him. Of course, he could spoil a picnic lunch, but so could he help to kill rattlesnakes!

We hope that the wild life has not been unkind.

•

Uncle Dick would like to hear from the young readers of his pages. He would like to know what they would like to hear about. He would like to know whether they like one long story or whether they would rather have several short stories. Perhaps they have some other ideas and if they have Uncle Dick would like to hear about them.

About the Universe

We believe that if students about to start upon the study of the physical sciences were to first read such a book as *The Architecture of the Universe,* the way would be smoothed for them, their interest would be stimulated and their resultant study would be immensely more valuable and enjoyable. Many students of high school grade find one or more of the sciences on their course of prescribed study, and many of these students have scant interest in and, often, slight adaptability to such courses. Nevertheless they have a dry-looking, diagrammatic textbook thrust at them and, unless they have a flair for this sort of study, proceed with the course as though it were a task. In the volume we have for review, Dr. W. F. G. Swann, director of the Bartol Research Foundation of the Franklin Institute, presents in an informal and often witty style a background of theories of physical science. It constitutes a splendid foundation upon which to build a structure of knowledge. The publishers are the Macmillan Company, New York, and the book lists at $3.75.

Lion Facts

Eric Wells is an Englishman who has spent a lifetime studying lions, both in their natural state and in various degrees of captivity. He has photographed them widely, also, and to his book, *Lions, Wild and Friendly,* he brings the results of both of these activities. Formerly having hunted the King of Beasts, Mr. Wells finally abandoned the gun in favor of the camera and adopted a policy of study in place of destruction. He has written a book that will be of interest to anyone interested in wild life and it contains many surprises for those who have pictured the lion as an exclusively treacherous and dangerous mammal. The book, beautifully illustrated, is published by the Viking Press and sells for $2.50.

A Fascinating Book

Attending Marvels by George Gaylord Simpson is a volume of a type that all too infrequently issues from the pen of the scientist. Dr. Simpson is Associate Curator of Vertebrate Paleontology at the American Museum of Natural History. He also led the Scarritt Expedition into Patagonia where strange fossils and many interesting living creatures were found. But here is not a dry account of the proportions and reconstructions of these extinct animals, or a scientific report of the living species found. Instead it is a journal of the experiences and adventures of the party and it makes fascinating and entertaining reading. It is an unusual blend of information on travel, exploration and research, charmingly and humanly told with dashes of rare humor. The publishers are the Macmillan Company and the price is three dollars.

Right Writing

Writers, whether tyros or experienced, would do well to have on their desk a copy of *Write it Right* by Ambrose Bierce. This valuable little volume, which has a subtitle, "A Little Blacklist of Literary Faults," is now brought out in a new edition by the Union Library Association, New York. The book sells for one dollar.

A Novel House Site

By Eddie W. Wilson

It is no unusual thing to see a hornet's nest hanging from the limb of a tree or from the eaves of a building, but a nest cunningly fitted into an empty corn shuck is rather a novelty.

Yet a certain colony of hornets chose just such a house site. From weather-worn boards and fences these deft paper manufacturers and builders gathered their tiny particles of wood, chewed them into a pulp, then fashioned their waterproof, many roomed house. They used the shuck for parts of the roof and sides.

Nature often has architectural surprises for those who keep their eyes open.

The Blue-fronted Jay

By Joe Burgess
Ranger Naturalist

(*From Yosemite Nature Notes*)

To me, the jay is not a vicious bird, but one full of mischief; full of the joy of being alive; at least different in his habits from most birds and often doing the unexpected. I usually renew my acquaintance around the end of June, when I find jays peaceably feeding on my bird table in company with grosbeaks, tanagers and an occasional nuthatch. Not so the Western robin for he would have the entire tray to himself and be constantly quarreling with other birds.

Full of mischief is the blue-fronted jay. Carrying away a baby golden-mantled ground squirrel and depositing him at our camp was one of his deeds while we were stationed at the Mariposa Grove of Big Trees. We adopted the squirrel, named him Micky, and with the aid of a medicine dropper from which he learned to drink Cocomalt, we were able to raise him. But back to jays.

Who, of Nature lovers, has not enjoyed watching jays as they hop from branch to branch as though full of tempered springs? Who has not listened attentively while, a few feet above one's head, a jay sings a song, in a small far-a-way voice, as sweetly as any canary and with just as full a repertoire?

Different he certainly is as he buries an acorn and in the way he eats. Holding the food on a branch with his feet and using his entire body he just hammers away with his bill until the hardest crust is broken and contents devoured.

As for the unexpected, one day I watched him fly from one car to another, clinging to the radiators while he got his lunch from the bugs embedded therein. So here's to the blue-fronted jay. With all his noise and impudence, I like him. He, at least, has the courage to be different.

A Soft Answer

By Lucille Lozier

In Florida, resting under the softly swishing pines, with their gracefully pendant beards of grey moss, *los barbados,* as the first Spaniards called them—resting, with eyes and ears keenly alert for any bits of bird gossip or song that might come my way, I had the delight of witnessing this little spectacle.

The soft snapping of drying grass told me of the approach of a meadowlark, and soon his neat brownish back appeared, and golden breast so accentuated by its crest of black. He walked daintily about—they do not hop—in search of titbits unobservable to my eye. Two greedy grackles in the pine tree overhead flew down beside him, defiance in their every gesture. The lark regarded them a bit contemptuously. Presently he found something, a most desirable morsel, and immediately the grackles were about to pounce upon it too. One grackle and the lark stood transfixed for a second, bill to bill, much as cocks ready for a fight. Then to my amazement the meadowlark lifted his bill towards the sky and his little throat swelling out, he sang a most sweet, heart-melting song. It was as golden a bit of melody as the throat from which it came. The grackle backed away, amazed and astounded. Again the lark sang, and again and again, till the grackle's surrender was complete. Thus does a gentle heart gain victory.

A Fine Bird Book

There is a new and valuable idea, ably executed, in Roger Tory Peterson's *Field Guide to the Birds.* It is a bird book on a new plan, namely that it is based on the fact that color values rather than the actual colors are most important in identifying birds at a distance. Carrying this out, Mr. Peterson profusely illustrates his book with illustrations, both in black and white and color, and the text is adapted to the new scheme of the book. The scope of the volume is eastern North America. We freely predict that no bird student who sees this book will be able to resist adding it to his library. It is published by Houghton Mifflin Company and sells for $2.75.

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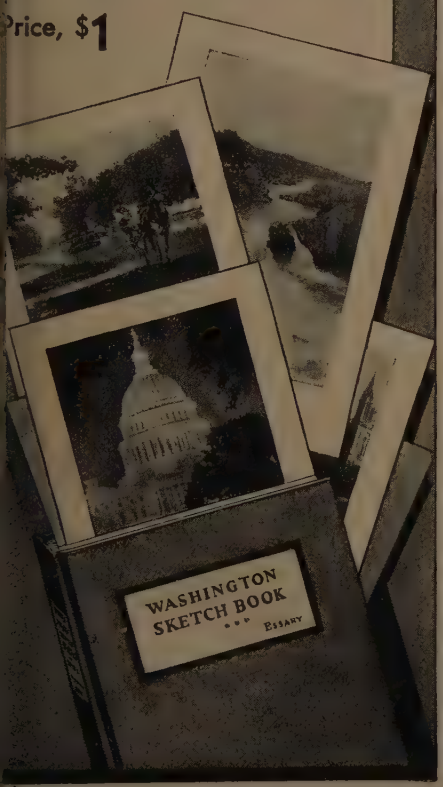

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Darling Seeks Facts

What are North America's most important waterfowl problems? Jay N. Darling, recently appointed chief of the Bureau of Biological Survey, U. S. Department of Agriculture, is making an effort to answer this question.

"We could solve our difficulties much more readily if everybody interested in this natural resource knew just what the problems are," says Darling. In this belief he is carrying on an intensive fact-finding and educational program.

"We Americans have been shooting ducks in the past," says the Bureau chief, "without knowing whether or not we have enough to kill. This year we expect to have accurate, up-to-date knowledge on the waterfowl conditions on this continent. On the facts we are gathering is going to depend the 'take' that will be allowed to shooters this year. And we are not going to guess at the matter. Naturalists of the Biological Survey will be making special investigations on wild-fowl breeding grounds this spring, and other employees of the Bureau and many cooperators also will be carefully observing conditions in their own localities. Sportsmen, conservationists, and Nature lovers generally, for their own special reasons, will await with interest the verdict to be reached."

A Robin Builder

Noticing several strings hanging from the limb of a tree one morning, Mary H. Craig of Philadelphia found her puzzlement partially answered by the appearance of a robin on the limb just above the strings. Then began the business of building a nest of mud, at which task the robin worked all day. When the nest was nicely fashioned the strings still hung below it until the robin started in by catching a piece of string in her beak, flying under the limb and tucking the string in the soft mud. This she did with each piece until the nest was secured to the limb. Then she surveyed her handiwork with pride and prepared to set up permanent housekeeping.

Wild Life Regulations

Secretary of Agriculture Wallace has announced two new regulations for the control of hunting and fishing in the National Forests. Under these regulations it will be possible to extend or to shorten hunting and fishing seasons in the National Forests with a view to managing the wild life resources of these Federal properties and to conserve both the timber and soils of the forests and the animals, birds and fish. The Forest Service plans to apply these new fish and game regulations only where present cooperative arrangements for managing the wild life within national forests have proved inadequate.

Deer Decline

Illegal hunting, disease, inadequate winter range and increase in predators are assigned by S. B. Show, chief of the California Region of the U. S. Forest Service, as reasons for the decline in the numbers of blacktail and mule deer in the eighteen national forests in California. The former have decreased eleven per cent and the latter eight, observations made by rangers last winter indicate.

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"Lil" Pete

By Helen Weil

Last night the Bird Angel of Death kissed him and this morning I found "Lil" Pete prone on the floor of his gilded cage—fast asleep after twenty beautiful years of life. One hundred years I should say, for each year of a bird's life flies on wings and is equal to five years of human life, which is not so blessed for it walks.

There he lay this once beautiful creature, quiet forever. When he came to us nineteen years ago he was only a youngster—his voice was not fully formed—there were long notes in it which made us hold our breath; they were always so deep and musical it brought joy into the household. A birthday gift he was to the mother who is now eighty-two years old. Her second sight was given her six weeks ago and for the last three weeks she had been able to see her beloved Pete once more. A changed Pete he was, bald headed, wings broken, feathers scraggy, and blind—blind but unbroken, chirping in his cage as he pecked at the bars finding his way about from seed vessel to water vessel. Only yesterday he chirped when he heard us talking to the other birds and years ago when a noted psychologist, who has written much about animals, heard about him he called him a genius bird and I am writing about Pete today for I feel that the world is better and brighter for his beautiful existence.

In the very beginning of things we let him have the freedom of our home. He flew from room to room and grew to be a familiar friend. At first he was somewhat shy of humans but it was not long before he knew that the trio of us were his friends. Early in the morning his song would awaken us and then the door of the cage, which was in the dining room, would be opened. By the time breakfast was served, Pete had usually sung his full hour, hopping from window to window as he carolled his various melodies. He knew my mother's chair and when she entered the room she would find him perched on the back of it ready for the choice morsel of breakfast which he would take bird-fashion out of her mouth. After he had had all he wanted, then round and round the room he would fly alighting on one head and then another. Sometimes as though he were jealous of the morning paper, he would perch on the edge of it and peer over at the reader, his two black eyes brightly scanning her face. If he could have spoken, this is what he would have said: "Talk to me! Talk to me, talk to me. I see! I see! I see!"

His favorite resting place was our heads. Perhaps the soft hair seemed like a nest. He had many remarkable tricks, most of them taught by himself. Once when one of his human friends was ill, she lay on the sofa very quiet. He could not understand why she did not play with him. Since his curiosity must be satisfied he alighted on the back of a distant chair and tried to reach her head which was buried in a pillow. The effort was futile and he missed his mark. Then he selected another chair less distant from the reclining figure. Again he missed his mark. A nearer chair was selected and another flight was made. This time the edge of the pillow was reached. Still another flight from a perch within two feet of the sofa and Pete had won. There he was softly at rest—a happy little bird perched on the reclining head of his friend.

After a year's residence it seemed a pity not to bring a bird companion into the house. Much affection was shown for the newcomer. One day our attention was arrested by Pete's particular call of distress. We answered it but could discover no occasion for it so we returned to our room and our book. Another and another importunate call came. Not to heed it would be a cruelty. An investigation followed. Near Pete's cage stood that of his companion, Puck. A few hours before a lettuce leaf had been given to each one of them. In Pete's cage lay a half eaten leaf. On the floor of the dining room not far from Puck's cage lay the uneaten lettuce leaf which had evidently fallen out when the bird had tried to reach it. Puck did not have sense enough to call us, so Pete who knew we would always come to him when needed, summoned us in behalf of his friend.

His evening song meant that the curtains must be lowered—and he would sing a peculiar strain which we had come to recognize and obey. All this sounds perhaps like a fairy tale yet it is a fairy tale of truth and not fancy. It is another attestation of the possibility of beautiful friendship and joy to be derived from such relationships.

Pete's longevity was most unusual. The average life of a canary in a household is less than three years. The birds are either pampered too much or entirely neglected. Good simple feeding, plenty of sunlight, some freedom if possible, some comradeship (we never passed Pete's cage without greeting him), absolute cleanliness and the lover of caged birds may be able to find another Pete.

It has been said by Professor William James, that a canary bird's brain for its size is one of the most wonderful creations in the animal kingdom. If this be true, are there not many slumbering Petes both wild and tame awaiting the magic touch of human recognition?

Fluffy

By Charlotte Fern Hoyt

Two years ago this July a poor half-starved dilapidated-looking English sparrow flew to our porch. It was near dusk and the little creature tried to find shelter on our window-sill and from there he flew on the screen which separates the open porch from the screened one. My mother was sitting there watching him, and, feeling sorry, thought she would see if he would come to her. She stepped out on the porch and held out her hand and the sparrow hopped upon it. Mother brought him in and cared for him until I came home. We put him in a little box for the night. My father christened the bird Fluffy.

Our friends didn't think the bird would live, but under good care he prospered and is now quite a sparrow. Two weeks after he came to us we were sure he was going to live; so mother bought a birdcage for him. When we put him in it he did not worry to get out and now when we take him out he flies to the cage to be let back in. He is fond of canary bird seed, canary song restorer, bread (fresh), cuttleshell and flies.

When I let him out of the cage he flies to my hand, looking for seed. He enjoys the radio very much, especially when someone is singing. Then he tries to sing louder than they. He sings quite well for an English sparrow except that he tries to sing so high that he squeaks.

Fluffy has three bells in his cage and when it begins to get dusk he jumps at them, making them ring. We then cover him for the night. If a light shines into his cage when he is trying to sleep he immediately finds one of the bells and rings it. He also does this when he wants something to eat.

The Rhesus Monkey

Little or nothing remains to be recorded about the Rhesus monkey with the publication of *The Anatomy of the Rhesus Monkey*. This is the collaborative work of nineteen scientists who have studied this animal, and to the collaboration is added the editorial attention of Carl G. Hartman and William L. Straus, Jr., who also are among the collaborators. This is a scientific book, as may be anticipated by looking at the imposing list of co-authors. It is of primary interest to students of anatomy, and, of course, to any student of the monkey kingdom or mammals generally. The publishers are the Williams and Wilkins Company, Baltimore, and the book costs six dollars.

Musk-Oxen Born

Transplanted from northeastern Greenland to Alaska four years ago, the herd of thirty-four young musk-oxen has been increased by the birth of two young animals, the first to be born in Alaska in about a century.

Poems About Dogs

The Judy Publishing Company, 3323 Michigan Boulevard, Chicago, offers an annual reward for what the judges regard as the ten best original dog poems in English. The contest closes December 31, 1934, and full details with respect to it may be obtained by writing to the address given.

Urges Wild Life Plan

Wild life should have a very definite and important consideration in the program of reconstruction that is now being planned and projected by the States and the Nation, said W. C. Henderson, associate chief of the Bureau of Biological Survey, U. S. Department of Agriculture, in an address delivered at the Central States Forestry Congress in Knoxville, Tenn.

Declaring that man has done almost irreparable damage to wild life in his indiscriminate, unguided, and unplanned exploitation of natural resources in this country, Mr. Henderson called for a coordinated effort in wild-life management and in forestry. "The establishment of game preserves on forested areas," he said, "affords opportunity to bring back suitable species, and under good management to provide a surplus for restocking other lands where conditions are favorable."

The few extra measures it is desirable to take to encourage wild life in forests are simple and inexpensive, said the Biological Survey official, and most of the recognized forestry principles are as favorable for wild life as they are to the forests. Fur and game species, he further pointed out, may be treated as a crop, and revenue may thus be derived from the disposal of shooting rights and from other sources during the period when trees are growing but none are being sold.

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RATTLESNAKE COMBAT

By R. Innis Bromley

Early in the fall, several years ago, while collecting for my embryo museum on a spur of hills north of Mt. Diablo, California, my attention was attracted by an unusual sound coming from the wild oats not far from where I was standing. At first, I thought it was the sound of the dry rattle weed which was plentiful on the hills there. On closer investigation, I saw two dark objects in the dry oats about seventy-five feet distant. Both were erect and stood about twelve or fourteen inches high. Approaching to within fifty feet, my curiosity was appeased to discover that the dark objects were two rattlesnakes, *Crotalus oreganus* in combat. I witnessed the fight for more than an hour. At each strike, their mouths were interlocked and they would roll on the ground, then relinquishing their grasp, they slowly arose to their former erect positions and continued striking each other time and time again. Each strike was accompanied by a terrible rattle. Tiring of being a spectator and seeing no advantage accruing on either side, I approached the combatants to within a few feet. They settled down, watching me and each other. Not more than two feet from me lay the object of their fight. I at once retreated to be out of striking distance of the female. At once it dawned upon me that it was a duel between two lovers contesting for the heart of the fair one. She, of course, would choose the victor. I again retreated to secure some weapon to dispatch them. One of the rattlers, seeing a good chance to escape, left the battle-field so rapidly that he could hardly be seen as he raced through the dry oats. I dispatched the remaining two.

I do not know how long they were fighting before I came upon the scene; but I was a witness for more than an hour. Had it not been for the lateness of the day, I would have remained until the contest terminated.

Often one hears of rattlers killing themselves by the infliction of their own bites. This does not seem to be so or founded on fact. I made a thorough examination of the head and mouth of the dead duelist. There was a small wound of the right eye and a small abrasion at the back of the mouth. No swellings or evidences of poisoning from their venom could be discovered. The venom of rattlesnakes seems to be innocuous to themselves when introduced into wounds on their own bodies. This seems to be proved by other investigators as well as by myself. I have seen rattlers strike each other but I have never observed any ill effects.

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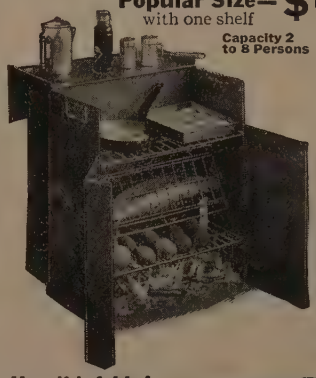

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THE CCC AND WATERFOWL

(Continued from page 22)

Mallards and pintails concentrate here, shorebirds find sanctuary during migration, and bobwhites are among the area's year-long residents. At this refuge the major improvement activities, during a period of nearly five months beginning on July 1, 1933, included erection of a telephone line four and one-half miles in length, removal of fire hazards on approximately fifty acres of woodland, building three lookout towers, clearing two miles of roadside, improving timber stands for upland game on fifteen acres, constructing one mile of new road, renewing and repairing six miles of existing roads, drilling two 400-foot wells, and constructing a bridge, one-half mile of fence, a machine shed, and an addition to the headquarters dwelling.

Two camps have also recently been assigned to Biological Survey supervision for work on wild-life refuges in Nebraska—one at the Crescent Lake Migratory Bird Refuge and the other at the Niobrara Big Game Preserve.

The Crescent Lake Refuge, an area of nearly 40,000 acres, includes Hackberry and Island Lakes and numerous smaller bodies of water, among the sandhills of Garden County. Ducks, geese, and shorebirds find these attractive, and prairie chickens inhabit the grass-covered sandhills. Here CCC workers will build fences around the duck-nesting areas on the lakes, and provide ditches, dikes, and wells for maintaining water levels. For efficient administration of the refuge they will make truck trails, install telephone lines, and build a field cabin for overnight use of protectors patrolling the area. This refuge, bisected by a public highway, includes a recreational area, which also will be improved by members of the CCC. Trees and shrubs will be planted—a valuable addition to an area that is now almost treeless.

Though primarily an area for buffalo, elk, and antelope, the Niobrara Big Game Preserve (along the Niobrara River, near Valentine, Nebr.) is also a bird sanctuary—frequented by ducks, shorebirds, prairie chickens, sharp-tailed grouse, quail, and other species. A veterans' camp of the Civilian Conservation Corps here will improve the area as a big-game preserve and also make possible its greater development for wild fowl. The workers will build fences for the big game, remove fire hazards, clean up brush, and construct truck trails. Across small creeks and gullies they will construct dams to conserve water, prevent erosion, and provide ponds for wild fowl. Other improvement activities will include drilling wells and planting trees on the sandhills for erosion control.

Dr. Nelson Passes

Dr. Edward William Nelson, who was Chief of the United States Bureau of Biological Survey from 1916 to 1927, passed away at Washington, D. C., on May 19, at the age of 79. His achievements will live after him in the form of many writings and he has left his name in zoological and geographical nomenclature as a result of his long and distinguished career in the scientific field.

Wanderlust

By Vera Johnson

I am in the woods with Nature alone as my companion. I need no path, for paths are made by man and frequented by man. Huge giant redwoods and firs tower above me. A delicate lacework of vines conceals the azure of the sky. The robins are mating, and their cheery song is brought to me on the breeze. A flutter of leaves, and a gayly colored oriole flies out into the open, circles a moment in mid-air, and then, with a queer cry, spreads his wings and flies away. What a dainty little creature he is with his flaming orange breast, perky little beak and bright little eye. As I look upward at his quickly disappearing shape, my ears catch the sharp, squeaky cry of a squirrel. There he is, on the rotting branch of a gnarled ancient oak tree. His tiny black nose is quivering like a bunny's and his eyes are fixed intently on me. I throw an acorn at him and away he scampers to look after the more important matter of food.

Far away I hear the booming of the surf on Siwash Rock and decide to go there. I soon reach Beaver Lake, which is a mass of tall, stately cattails, and white and gold waterlilies. The water is hardly visible, and one would imagine that it was merely a dense vegetation growing in the fertile soil of the forest, but one slip into that treacherous bog, and the mud would slowly suck a person down to a horrible death. I shudder as I pass by, and wonder why Mother Nature seems to cloak all evil, treacherous things with deceiving beauty. A gloom settles over me, but is dispelled as I am once more impressed by the rustic beauty of the forest. The roaring of the waves grows louder, and soon I emerge upon the cliff edge. Such a scene!

Far as the eye can reach, the restless waves are tossing and heaving. A hundred yards from the stony beach stands Siwash Rock, rugged sentinel of the seas. The waves are breaking with terrific force at its base, and the salt spray is thrown high. It inspires in me a wild desire to conquer, and is there anything more difficult than climbing the steep sides of Siwash Rock and gaining its airy summit?

The descent down the cliff face is very precarious, and one slip may mean that my life will be dashed out on the jagged rocks below, but to-day I am very determined and nothing can stop me. At last after an interminable time I reach the shore and proceed to divest myself of my shoes and stockings. I glance anxiously at the sun, for the ascent must be made before dark. Now I quickly cross the shallow water separating Siwash Rock from the mainland. I find a good grip on a rocky ledge and pull myself upwards. The rock itself is honeycombed with small caves and sharp, jutting points of stone, and the climbing is easier than I thought. At last I reach the height, just as the vivid sun is sinking slowly in the West.

Shafts of red, mauve, orange, blue, pink, gold and yellow are shooting in all directions. Slowly a rosy pink tints the surroundings, and then, silently, night throws her velvet wrap around the world and all is darkness. As I stand there a moment drinking in the fresh air, the breeze seems to whisper part of a little song that I learned in grammar school:

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Waterfowl Problem

A hundred years ago the population of ducks and geese in North America seemed beyond calculation. The unnumbered marshy and grass-bordered ponds and sloughs of the Great Plains, the Great Basin, and the Far West, and the lesser swamps of the East all gave breeding sites and food to waterfowl. In autumn, when to these native flocks were added the hordes that came from the vaster nurseries of Canada and Alaska, the millions that sought rest and food in the marshes of the United States made words seem weak. So had they gathered for centuries. Through the ages their natural enemies had taken toll, and the Indian, with his bow and arrow and nets, had reaped his meager harvest; but the myriad supply, balanced by the great forces of nature, persisted and probably varied little from year to year.

The pioneer fared westward and the farmer followed him, and each took his mite from Nature's bounty. Men plowed, and drained, and built cities. Market hunting became a trade. Still no one noticed any diminution in the waterfowl supply, save here and there some far-seeing individual whose words carried no weight. The destruction continued and multiplied. The agricultural belt crept northward into Canada, and the human population doubled and then trebled. Better guns were made, and means of travel were improved. The still small voice of warning was yet unheeded. Perhaps there were not quite so many ducks and geese left, but why should the hunter worry, when one could still kill all he could carry? Was not the boundless north still set to its task of rearing ducks and geese to furnish sport and business for the United States? Conservationists of all creeds preached, each in his own way; but there resulted only half-hearted methods to stem the destruction.

Such were the general conditions confronting our waterfowl at the close of the Nineteenth Century. The first restrictive measures emphasized curbing market hunting, and gradually this practice diminished in volume. The development of new methods of taking waterfowl, the improvement of firearms, and better transportation facilities, however, permitted the march of destruction to continue unabated. Wild-life refuges were established, but still the waterfowl diminished. An international treaty, designed to protect migratory birds and supported by enabling legislation both in the United States and Canada, increased the interest in protecting waterfowl and resulted in additional beneficial legislation. But lower bag limits, shortened seasons, and bird refuges all failed to stem effectively the tide of destruction.

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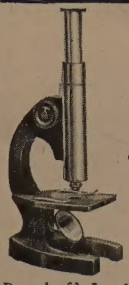

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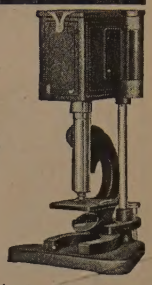

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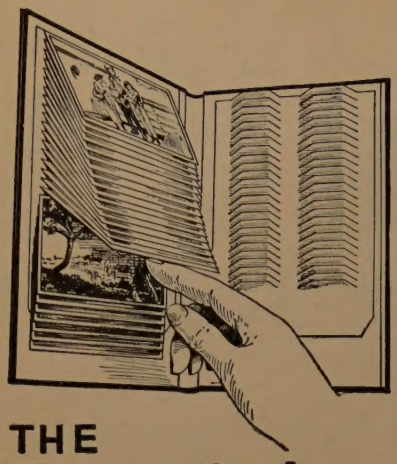

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and the Prairie Provinces of Canada focused attention on the serious plight of our ducks and geese is a story too well-known to require repetition. This cycle of drought was merely the latest one of a series through which the waterfowl populations of earlier periods had passed without permanent damage. To many, the drought was only a serious calamity, but in reality it might be considered a timely lesson, a phenomenon not altogether without benefit; for the vital necessity of a better system of conservation was at once apparent to all who were willing to face the facts.

Now the work of retiring from agriculture large tracts of sub-marginal lands seems to offer an opportunity to dedicate many more areas to the use of game and other useful birds, upland and aquatic, migratory and resident. Such aids, however, must be supplemented by increased care in safeguarding and building up the present supply.

As an aid in understanding and solving the problem, the United States Bureau of Biological Survey has prepared a series of maps on which are shown the principal breeding grounds of our more important species of waterfowl, and the areas over which they are shot for sport in Canada and the United States. The range as outlined in each case is intended to show the region where the bulk of the bird population is raised; many outlying breeding records are therefore ignored. Similarly, the shooting is necessarily confined to areas suitable for waterfowl occupancy.

A study of this series of maps, and a consideration of the brief statements that accompany them, should emphasize our obligation to throw all possible safeguards around these valuable species.

RABBIT ANTICS

By A. W. Hubbard

Shortly after six o'clock one evening recently as we were passing a window that looked out on the back yard we noticed two rabbits who were acting strangely. Closer examination showed that they were engaged in a "game". After facing off about three or four feet apart, one of the rabbits would rush directly at the other, and the second rabbit would jump into the air as the first passed under. Occasionally they would vary this: the first would rush up and turn, while the second jumped to one side. Sometimes the rabbit would merely jump high enough for the other rabbit to pass under, but most of the time it would go up a good three feet. Occasionally when the running rabbit would stop fairly close to the other one that one would, upon alighting, run at the first and make him jump. They would then do their rapid alternation several times until one hopped away. However, when one of the members of our group went to the garage to bring out the car, one of the rabbits hopped out of sight, and the other remained to bathe and eat grass.

California Scientists

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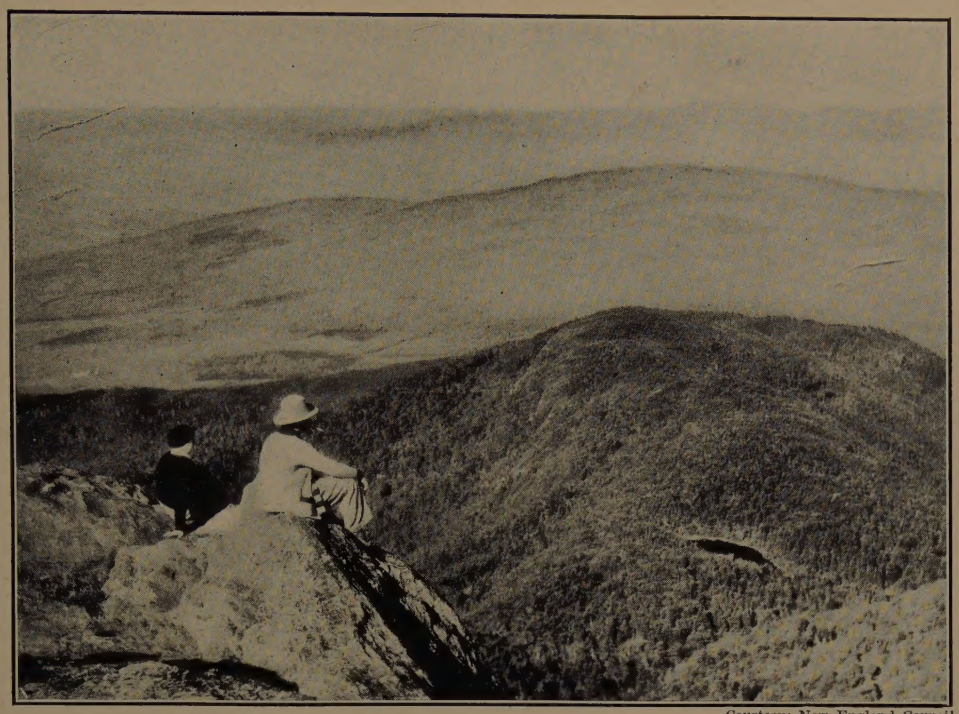

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* * *

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Pat. Applied for. Posed by Miss Jane Buchanan of "She Loves Me Not"

No. 23—Yellow and white check with yellow frame (top design)

No. 24—Red and white check with red frame

No. 25—Orange and brown plaid with yellow ground and brown frame

No. 26—Red and black plaid with white ground and white frame

No. 20—Red and white crowfoot with red frame (lower design)

No. 21—Brown and white crowfoot with brown frame

No. 22—All white crowfoot with pink frame

"LAZY-BACK" CHAIR
Price $5.00 each

"LAZY-BACKS" provide the answer to the demand for a really smart and individual chair of this type. You may recline, rock or sit comfortably erect by a simple adjustment of a convenient strap without rising from the chair. Available in seven attractive color combinations. Both fabrics and frames are weatherproof and the frames come in the effective new "rubbed color" finish.

FOLDING TABLE

No. 101 For drinks, cigarettes, etc. (Illustrated at left)

Price $4.50 ea.

No. 102 Beach Bridge Table (not illustrated) size 27" x 27".

Price $5.00 ea.

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Small illustrations show convenience and range of usefulness of both the "Lazy-Back" chair and the Folding Table which is available in finishes to match.

COUPON

LAZY-BACK DISTRIBUTORS
1212-Sixteenth Street, N. W.
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Please ship me postpaid "Lazy-Back" chair No. ..... or Folding Table No. ..... My check for $..... in full payment is enclosed.

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Street & No. .....

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